Arkansas Department of Health

RULES AND REGULATIONS

PERTAINING TO

ONSITE WASTEWATER ~~SEWAGE DISPOSAL~~ SYSTEMS,

DESIGNATED REPRESENTATIVES

AND INSTALLERS

ACT 402 OF 1977

A.C.A. 14-236-101 et seq.

~~ENVIRONMENTAL PROGRAM SERVICES~~

~~DIVISION OF ENVIRONMENTAL HEALTH PROTECTION~~

~~March 1994~~

Effective Date

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Section 1. Authority and Purpose

1.1. The following RULES AND REGULATIONS PERTAINING TO ONSITE WASTEWATER SYSTEMS, DESIGNATED REPRESENTATIVES, INSTALLERS AND MANUFACTURERS are duly adopted and promulgated by the Arkansas State Board of Health pursuant to the authority expressly conferred by the laws of the State Arkansas including, without limitation, Act 96 of 1913 (A.C.A. {20-7-l09), and Act 402 of l977 (A.C.A. {14-236-101, et seq.).

1.2. Purpose: To ~~provide requirements~~ establish minimum standards for the design and construction of ~~individual sewage~~ onsite wastewater systems in suitable soils for the renovation of wastewater and the return of the renovated wastewater into the hydrologic cycle.

~~There are a number of State and local regulations that apply to the installation and operation of septic tank systems. Therefore local health, municipal or county officials should be contacted regarding regulations, ordinances, permits, or inspection requirements before installing a septic tank system.~~

~~The Arkansas State Board of Health RULES AND REGULATIONS PERTAINING TO GENERAL SANITATION and the Rules and Regulations Pertaining to Sewage Disposal Systems, Designated Representatives and Installers are to be followed.~~

Section 2. Definitions

2.1. **Alternate Onsite Wastewater System.** A non-standard individual wastewater treatment or collection system approved by the Department in instances where a standard system is not suitable.

2.2. **Approved System.** An onsite wastewater system constructed and installed in accordance with the standards and requirements of this Regulation and for which a Permit for Operation has been issued. "Approved system" does not imply that the system will perform satisfactorily for a specific period of time, only that the system has meet the minimum requirements of this Regulation.

2.3. **Authorized Agent.** The Environmental Health Specialist assigned to the County, or Business Unit by the Department.

2.4. **Bedrock.** Consolidated rocks such as sandstones, siltstones, and shale, which essentially retain their depositional or tectonic orientation. Fine earth materials shall constitute less than 10% of the materials and no other conditions exist that would provide adequate wastewater renovation.

2.5. **Benchmark.** A mark made on a stationary object of a determined position and elevation and used as a reference point.

2.6. **Community Wastewater System.** Any system, whether public or privately owned, serving 2 or more individual lots, for the collection, treatment and disposal of wastewater

or industrial wastes of a liquid nature, including various devices for the treatment of such wastewater or industrial wastes.

2.7. **Department.** The Arkansas Department of Health.

2.8. **Designated Representative (DR).** A person designated by the authorized agent to make percolation tests, system designs and inspections subject to the authorized agent's final approval. Designated representatives shall be registered professional engineers, registered land surveyors, licensed master plumbers, registered authorized agents or other similarly qualified individuals holding current certificates from the State of Arkansas, and shall demonstrate to the satisfaction of the authorized agent prior to their designation as a "designated representative" their competency to make percolation tests, designs and final inspections for onsite wastewater systems in accordance with these Rules and Regulations and when authorized by the Authorized Agent.

2.9. **Dwelling Unit.** A structure intended to be used as a residence. A single structure may contain more than one dwelling unit: e.g., a duplex contains 2 dwelling units.

2.10. **Distribution Box.** A watertight box that receives the discharge of effluent from the septic tank and distributes the flow of wastewater equally to each absorption trench.

2.11. **Distribution Device.** A device, approved by the Department, used to distribute or alternate the effluent load between 2 or more locations.

2.12. **Domestic Wastewater.** All wastes discharging from sanitary conveniences and plumbing fixtures of a domestic nature, exclusive of industrial and commercial wastes.

2.13. **Dosing Tank.** A tank constructed of concrete, plastic, fiberglass or other approved material that contains one or more pumps or automatic siphons designed to deliver a specified volume of wastewater effluent to the distribution system.

2.14. **Emergency Repair.** The repair and/or replacement of any part of a malfunctioning onsite wastewater system, excluding the alteration of existing absorption trenches and/or the installation of additional absorption area, that poses an immediate public health hazard.

2.15. **Engineering.** The engineering section of the Arkansas Department of Health.

2.16. **Experimental Onsite Wastewater System.** A sewage treatment system that is not classified as a standard or alternate onsite wastewater system. Experimental systems may be approved on a case-by-case basis and evaluated under the direction of the Department to determine the effectiveness of the system.

2.17. **High-use Area.** Any site accessible to the public for the purposes of entertainment, recreation, or gathering.

2.18. **High Water Mark.** The line which the water impresses on the soil by covering it for sufficient periods of time to deprive it of non-aquatic vegetation or the established maximum flood elevation of lakes with constructed dams.

2.19. **Homeowner.** A person who owns and occupies a building as his home.

2.20. **Hydraulic Conductivity.** The rate of water movement under unit gradient in a specific soil horizon.

2.21. **Onsite Wastewater System.** A single system of treatment tanks and/or renovation facilities used for the treatment of domestic wastewater, exclusive of industrial wastes, serving only a single dwelling, commercial facility such as an office building, or industrial plant or institution.

2.22. **Industrial Wastes.** Liquid wastes resulting from the processes employed in industrial and commercial establishments.

2.23. **Installer.** Any person, firm, corporation, association, municipality, or governmental agency, which constructs, installs, alters or repairs onsite wastewater systems for others.

2.24. **Interceptor Drain.** A subsurface drainline, usually constructed upgrade from the absorption area to divert seasonal groundwater.

2.25. **Lake.** A considerable body of inland water or an expanded portion of a river generally of appreciable size and too deep to permit vegetation, excluding subaqueous vegetation, to take root completely across the expanse of water.

2.26. **Maintenance Personnel.** An individual certified by the Department to conduct assessments under the Onsite Maintenance and Monitoring Program.

2.27. **Municipality.** A city, town, county, district, or other public body created by or pursuant to State law, or any combination thereof, acting cooperatively or jointly.

2.28. **Pedon.** The smallest classifiable soil units. Pedons are intended to be of a size suitable for field examination, description, and sampling.

2.29. **Person.** Any institution, public or private corporation, individual, partnership, or other entity.

2.30. **Piezometer.** A pipe placed in the soil which gives the water pressure at depth which is used to estimate the elevation of a water table.

2.31. **Pond.** A body of water smaller than a lake, often artificially formed.

2.32. **Potable Water.** Water free from impurities in amounts sufficient to cause disease or harmful physiological effects with the bacteriological and chemical quality conforming to applicable standards of the Arkansas State Board of Health.

2.33. **Primary Absorption Area.** The area approved by the Department or it's authorized agent for the installation of an onsite wastewater system for a specified tract of land.

2.34. **Professional Soil Classifier (P.S.C.).** A person who, by reason of their special knowledge of the physical, chemical, and biological sciences applicable to soils as natural bodies and of the methods and principles of soil classification experience in the formation,

morphology, description, and mapping of soils, is qualified to practice soil classifying, and who has been registered by the Arkansas State Board of Registration for Professional Soil Classifiers.

2.35. **Property Owner.** A person who owns and may or may not occupy the property.

2.36. **Property Owners' Association.** An association created by and pursuant to State law and organized for the purpose of maintaining common facilities including onsite wastewater facilities in unincorporated subdivisions.

2.37. **Redoximorphic Features.** Soil features formed by the processes of reduction, oxidation, and translocation of iron and manganese oxides in seasonally saturated and reduced soils.

2.38. **Relic Redoximorphic Features.** Redoximorphic features that are observed in the soil profile but are not indicative of contemporary seasonal water table levels. Redoximorphic features may not be considered relic unless they meet the guidelines as specified in Section 8.4.1.1 or are evaluated by a monitoring process as specified in Section 8.4.6.

2.39. **Restrictive Soil Layer.** A soil layer that impedes the movement of water, air or growth of plant roots. Examples of such layers or conditions are traffic pans, claypans, fragipans, compacted soil, bedrock and clayey soil.

2.40. **Scum.** The accumulated floating material, including grease, oils and other low-density solids in a septic tank.

2.41. **Secondary Absorption Area.** An alternate location indicated on a lot or plot plan showing where the absorption area is to be placed in the event of failure or necessary replacement of the system located on the primary absorption area.

2.42. **Seasonal Water Table (SWT).** A zone of soil that become saturated for periods long enough to undergo reducing conditions during periods of climatic stress due to an underlying restrictive layer. The seasonal water table may be classified as brief, moderate, or long.

2.43. **Septic Tank.** A single tank or series of tanks that receives raw domestic wastewater and serve as the primary treatment unit in an onsite wastewater system. The septic tank provides skimming and storage of scum, settling and storage of the wastewater solids, and the partial digestion of accumulated solids by anaerobic action. Clarified effluent then flows from the septic tank to the absorption area for further treatment.

2.44. **Septic Tank Manufacturer.** A person, firm, corporation or association who manufactures septic tanks, package treatment units or other components for onsite wastewater systems.

2.45. **Similarly Qualified Individual.** A bachelor's degree with 30 hours of natural science, engineering and/or math, or 3 years experience verified by the Department in the design of onsite wastewater systems.

2.46. **Sludge.** The accumulated solids that have settled to the bottom of a septic tank.

2.47. **Soil Absorption System.** The system for the final renovation of the septic tank effluent and return of the renovated wastewater to the hydrologic cycle, including the lateral lines, the perforated pipes, the rock or other approved material and the soil absorption trenches.

2.48. **Soil Horizon.** A layer approximately parallel to the surface of the soil distinguishable from adjacent layers by a distinctive set of properties produced by the soil forming process.

2.49. **Soil Pit.** An onsite excavation. The excavation shall be of adequate size to observe depth to seasonal water tables, depth to bedrock, or impervious layers. The soil pit is a minimum of 24 inches in width, and dug to provide ease of access such as steps or a moderate slope. The excavation shall be 4 feet in depth unless an impervious layer is encountered and shall provide an exposed sidewall area of at least 3 feet in length. It is used to observe those soil characteristics relevant in determining soil suitability for wastewater absorption and renovation.

2.50. **Soil Qualified Designated Representative.** A Designated Representative who has successfully passed the soils portion of the D.R. testing procedure, as set forth by the Arkansas Department of Health. These individuals are certified to size absorption areas based on depth to seasonal water tables.

2.51. **Soil Textural Class.** The relative proportions by weight of the three mineral fractions sand, silt, and clay as defined by the USDA soil texture classifications

2.52. **Stream.** A year round flowing stream as designated by the United States Geological Survey.

2.53. **Subdivision.** Land divided or proposed to be divided for predominantly residential purposes into such parcels as required by local ordinances, or, in the absence of local ordinances, subdivision means any land which is divided or proposed to be divided by a common owner or owners for predominantly residential purposes into 3 or more lots or parcels, platted or unplatted units any of which contains less than three acres, as a part of a uniform plan of development.

2.54. **Surface Discharging System.** Those systems that apply effluent directly to the soil surface or are sized less than that determined by seasonal water table loading rates as outlined in this regulation.

2.55. **True Water Table.** The upper surface of a saturated zone within the soil that is directly connected to a regional aquifer.

2.56. **Undisturbed Soil.** Soil which has developed by the actions of the soil forming processes and which has not been disturbed or altered by the human activities. Exception: plow layers less than 7 inches from the soil surface.

2.57. **Valid Permit.** A permit for construction is valid for a period of one year from the date of approval.

2.58. **Wastewater.** Any sewage containing animal or vegetable matter in suspension or solution, including but not limited to liquid wastes from toilets, kitchen sinks, lavatories, washing machines and other plumbing fixtures.

2.59. **Wet Season.** The period within a year when rainfall normally exceeds evapo-transpiration and a seasonal water table can be expected to be at its highest level in the soil.

Section 3. Variances and Exemptions

3.1. Requested variations from these Rules and Regulations will be considered and may be approved at the sole discretion of the Department.

3.2. Submission of proposed experimental onsite wastewater systems may be approved, disapproved, or approved on a trial basis for a specific period of time. Such approval or disapproval shall be at the sole discretion of the Department. Submission of an experimental design shall include design data as to the efficiency of operation of the proposed experimental system. A monitoring plan shall be submitted for approval in addition to the system design.

3.3. Good management practices. Good management practices are additions or modifications to systems which will make such systems more efficient, or which could make such systems acceptable in certain soil conditions. Where good management practices are proposed for inclusion in a soil absorption system, approval shall be at the discretion of the Department or its Authorized Agent.

3.4. Existing installation. No onsite wastewater system in existence on the effective date of these Rules and Regulations nor any onsite wastewater system installed after the effective date of these Rules and Regulations in a subdivision, wherein individual lots have been developed or sold for use with onsite wastewater systems for which a plat has been filed on record prior to the effective date of these Rules and Regulations shall be required to conform to more stringent specifications and requirements as to design, construction, density of improvements, lot size and installation than those standards contained in any applicable duly adopted and published regulations in effect at the time of platting of record of such subdivisions. No onsite wastewater system to be installed on a residential lot for which the Department or its authorized agent has issued a construction permit on or before the effective date of these Rules and Regulations shall be required to conform to the design, construction and installation provisions of these Rules and Regulations. In a subdivision for which a master plan has been approved by the Department prior to the effective date of these Rules and Regulations or for which the Department has otherwise previously issued its written approval for the installation of onsite wastewater systems and where individual lots have been developed or sold in reliance upon such prior written approval, onsite wastewater systems shall not be required to conform to more stringent specifications as to design, construction and installation than those standards in effect at the time of, or referred to, in such prior written approval. However, it is provided, that any onsite wastewater system which is determined by the Arkansas Department of Health to be a health hazard or which constitutes a nuisance due to odor or unsightly appearance must conform to the provisions of these Rules and

Regulations within 30 working days after notification that such determination has been made.

Section 4. Sewer Connection

4.1. All premises shall be connected to a sanitary sewer when within 300 feet and available to said premises when connection can be made without crossing another person's property. No privies, onsite wastewater systems or other receptacles for human excreta shall be constructed, maintained, or used on the premises. Plumbing fixtures shall be installed and maintained in accordance with the ARKANSAS STATE PLUMBING CODE. (See Ark. Stat. Ann. 19-4125-4127.)

4.2. When connection to an existing system is not feasible and a large number of residences are to be built in an area, consideration should be given to the construction of a community sewer system and treatment plant. However, since an improperly operated or inadequately staffed community wastewater treatment plant cannot effectively treat wastewater, consideration should be given to the size of the proposed system to ensure that economically feasible sewer rates are sufficient to ensure proper treatment plant operation. As an aid to developers and engineers, the following information is offered to determine the feasibility of a public sewer system or onsite wastewater system.

Population Density	Equivalent Lot Size	Service Economic Justification
Over 5,000 persons per sq. mi.	Less than 1/2 acre	Public sewerage is justified
2,500-5,000 persons per sq. mi.	1/2 to 1 acre	Public sewerage normally is justified
1,000-2,500 persons per sq. mi.	1 to 2 acres	Public sewerage normally is not justified
less than 1,000 persons per sq. mi.	Over 2 acres	Public sewerage rarely is justified

Section 5. Permitting Requirements

~~A. Submission of plans~~

5.1. A completed Onsite Wastewater System Permit Application and detailed plans and specifications following the requirements found in Appendix H for the collection, treatment and/or ~~disposal~~ renovation facilities for all wastes of a domestic nature, containing a predominance of human excreta and exclusive of industrial wastes shall be submitted to and receive the approval of the Arkansas Department of Health or its authorized agent, prior to construction of a building or residence. ~~The Division of Environmental Health Protection will establish guidelines on the permitting procedures and information required~~

~~before a permit is accepted for review. The guidelines will be periodically updated to reflect necessary procedural changes.~~

5.2. Onsite wastewater systems in subdivisions or in platted or unplatted lots or tracts of land as provided in Act 402, must be planned, designed and constructed in accordance with the RULES AND REGULATIONS PERTAINING TO GENERAL SANITATION and the RULES AND REGULATIONS PERTAINING TO ONSITE WASTEWATER SYSTEMS, DESIGNATED REPRESENTATIVES AND INSTALLERS of the Arkansas Department of Health. Permits for construction and operation of onsite wastewater systems must be obtained in accordance with the RULES AND REGULATIONS PERTAINING TO ONSITE WASTEWATER SYSTEMS, DESIGNATED REPRESENTATIVES AND INSTALLERS prior to the construction, installation or modification of the Onsite Wastewater System.

5.3. Permit requirement. It shall be unlawful for any person, firm, corporation, association, municipality or governmental agency to begin construction, alteration, repair or extension of any onsite wastewater system, owned by any other person, firm, corporation, association, municipality or governmental agency until the owner first obtains a valid Permit for Construction issued by the Department or its authorized agent.

5.4. It shall be unlawful for any person, firm, corporation, association, municipality or governmental agency to begin operation of any onsite wastewater system until such system has been inspected and approved by the Department or its authorized agent and the owner has first obtained a Permit for Operation issued by the Department or its authorized agent.

5.5. It shall be unlawful for any installer to begin construction, alteration, repair or extension of any onsite wastewater system owned by any other person, firm, corporation, association, municipality or governmental agency until the permit holder or installer first notifies the authorized agent a minimum 24 hours prior to the date he plans to begin work on said system. Emergency repairs may be undertaken without prior notification to the authorized agent provided notification is made as soon thereafter as is reasonable.

5.6. To those cities or counties with authorized agents, the authorized agent shall be the authorized agent of the Department. In the event that an authorized agent has not been designated for a city or county, applications for onsite wastewater systems shall be made to the Department. Application forms and instructions may be obtained from the authorized agent or from the Department.

5.7. Plan review fee. A fee of thirty dollars ($30.00) shall be levied for the review of each permit. Permit fees shall be made payable to the Arkansas Department of Health. The review fee of thirty dollars ($30.00) must be paid before the issuance of Part 1 of the Permit Application. There shall be no refund of the fee or any part thereof due to failure to proceed under the Permit Application. Construction must begin within one year of issuance or the permit must be re-validated by the Department or its authorized agent.

5.8. Permit Procedure

5.8.1. Part I of the Permit is the Permit for Construction. Part I of the Permit Application form must be completed by a Designated Representative and approved by the Department or its authorized agent prior to initiating construction. The information to

be reported in this portion includes the results of the percolation test, soil determination results, lot dimensions, system design, system layout and other information required by the Department or its authorized agent. **NO CHANGES OR ALTERATIONS MAY BE MADE TO THE SYSTEM PRIOR TO OR DURING CONSTRUCTION WITHOUT PRIOR APPROVAL OF THE AUTHORIZED AGENT.**

5.8.2. Part II of the Permit Application is the installation inspection. An installation inspection may be made during the construction of any onsite wastewater system. The inspection may be made during any phase of the installation.

5.8.2.1. It shall be the duty of the holder of the Permit for Construction or the installer to notify the authorized agent or Designated Representative, when the installation is ready for inspection. It shall be the duty of the owner or occupant of the property to give the Department, its authorized agent or designated representative, free access to the property at reasonable times for the purpose of making the installation inspection. The installation shall not be covered without approval from the authorized agent.

5.8.2.2. The inspection may be made by the authorized agent, but may be made by their designated representative at the approval of the authorized agent.

5.8.2.3. In the event an inspection is not made 2 working days from the date of notification to the Department of Health, its authorized agent or designated representative, that the installation is completed and ready for inspection, elevation shots will be recorded and the system shall be deemed approved.

5.8.2.4. Any person aggrieved by the disapproval of an onsite wastewater system installation shall be afforded review as provided in Act 434 of 1967, the ARKANSAS ADMINISTRATIVE PROCEDURE ACT.

5.8.3. PART III of the PERMIT is the PERMIT FOR OPERATION. After approval of the inspection, the authorized agent will approve and issue a PERMIT FOR OPERATION (PART II and PART III of the PERMIT). The system shall not be used until the PERMIT FOR OPERATION is issued. The authorized agent will retain the original and return the remaining copies to the owner.

5.8.4. Refusal of permit. Except as provided in Section 3.4, a PERMIT for the construction, alteration, repair, extension or operation of an onsite wastewater system or alternate/experimental system shall be refused where public sewer systems are reasonably available or economically feasible, or in instances where the issuance of such PERMIT is in conflict with the other applicable laws and regulations or where the issuance of such permit is in conflict with the public policy declared in Act 402 of 1977 as amended, except that emergency repairs may be undertaken without prior issuance of a PERMIT, provided a PERMIT is subsequently obtained within 10 working days after the repairs are made.

~~B. Sewer construction~~

~~All premises shall be constructed to a sanitary sewer when within 300 feet and available to said premises so a connection can be made without crossing another person's property. And no privies, septic tank systems or other receptacles for human excreta~~

~~shall be constructed, maintained, or used on the premises. Plumbing fixtures shall be installed and maintained in accordance with the ARKANSAS STATE PLUMBUING CODE. (See Ark. Stat. Ann. 10-4125-4127.)~~

~~C. Subdivision Plans~~

5.9. Subdivision Review

5.9.1. All subdivision plans which are proposed to utilize ~~individual sewage disposal~~ onsite wastewater systems as a method of ~~sewage disposal~~ wastewater treatment for all or part of the lots or tracts in said subdivision shall be submitted to the Arkansas Department of Health for review and approval of the overall plan for the utilization of ~~individual sewage disposal~~ onsite wastewater systems. The procedure for subdivision review and approval shall be as follows:

5.9.2. Submission shall be made to the ~~Division of Environmental Health Protection~~ Local County Health Unit and shall include data on soil pits, percolation tests (if applicable), ~~soil determinations, their~~ respective test location, location of nearest public or community sewer system, details as to topography and information as to the present and future land use of the subdivision and of adjoining lands, and such other information as may be required for the review. The ~~Division of Environmental Health Protection~~ Department will establish guidelines on subdivision plan submission and review policies. These guidelines will be updated periodically as necessary.

5.9.3. The ~~Division of Environmental Health Protection~~ Department shall review the submission to determine if ~~septic tank~~ onsite wastewater systems or alternate systems ~~of individual sewage disposal~~ could effectively ~~dispose of sewage from~~ treat wastewater for the subdivision. Should the ~~Division of Environmental Health Protection~~ Department find the subdivision acceptable for ~~individual sewage disposal~~ onsite wastewater systems, ~~they~~ prior to final approval it shall refer the submission to ~~the Division of~~ Engineering for their comments and recommendations with respect to the advisability and ~~economic~~ feasibility of a community sewer system and treatment plant or connection to a public sewer system. After receipt of comments and recommendations from ~~the Division of~~ Engineering, the ~~Division of Environmental Health Protection~~ Department shall approve or disapprove the submission and if disapproved, shall refer the applicant to ~~the Division of~~ Engineering for information, review and approval as to a community sewer system and treatment plant or connection to a public sewer.

5.9.4. The plan review fee will be thirty dollars ($30.00) for the first lot and five dollars ($5.00) for each additional lot with a maximum fee of five hundred dollars ($500.00).

5.9.5. The following items will be included in all subdivision plans:

5.9.5.1. Vicinity map and legal description indicating the location of the subdivision

5.9.5.2. Layout of lot boundaries, streets, easements, all topographical features, and flood level of the area.

5.9.5.3. Contour lines at 5 to 20 feet intervals shall be shown as relating to lot boundaries and the location of test performed.

5.9.5.4. Subdivision with wells will show proposed well location for each lot.

5.9.5.5. Subdivisions with Public Water Facilities require detailed engineering plans and specification for the water systems submitted by an engineer licensed in the State of Arkansas to the Engineering Section of the Arkansas Department of Health.

5.9.5.6. Addresses of all parties to receive copies of the subdivision.

5.9.5.7. Three (3) copies of the plans are required.

5.9.5.8. Flood level determination.

5.9.6. Primary absorption areas in a subdivision shall be sized according to natural soil conditions. Capping fill may be used to overcome separation to bedrock; however, in primary absorption areas, no reduction in loading rate shall be granted for the purpose of determining minimum lot size. Secondary absorption areas may be sized utilizing capping fills for the purpose of determining minimum lot size.

5.9.7. Submission shall be made to the Local County Health Unit utilizing one of the following approved methods:

5.9.8. Subdivision Review and Soils Mapping

5.9.8.1. When utilizing soil mapping for subdivision review, the soil map shall be submitted by a Professional Soil Classifier. When soil mapping a subdivision for the purpose of designing subsurface onsite wastewater systems, a high intensity map is required. A high intensity map details the location and extent of the soils and landscape features sufficiently for site evaluation for subsurface wastewater renovation. The final report consists of a soils map and a soils report.

5.9.8.2. Field procedures for Mapping Subdivisions

5.9.8.2.1. Soil maps for subdivisions are to be made from a maximum grid of 100 feet. Grid points must be accurately located and identified using flags or stakes. A soil pit must be located at each grid point and identified with the corresponding flag or stake. The maximum distance allowed from a property line to an outside perimeter grid line is 50 feet.

5.9.8.2.2. A soil description must be made from each soil pit in accordance with the National Cooperative Soil Survey.

5.9.8.3. The Soil Map

5.9.8.3.1. The soil map should be compiled at a scale of 1 inch = 100 feet.

5.9.8.3.2. The soil map must show all map units. A map unit is a collection of areas defined and named the same in terms of their soil properties. Each map unit differs in some respect from all others and is uniquely identified on a soil map. Each individual area on the map is a delineation. Areas consisting of 625 square feet or more shall be delineated. Areas

consisting of less than 625 square feet are inclusions and must be identified in the map unit description. Soil map units are to be named by their numerical ranking with respect to suitability for subsurface wastewater renovation. Example: The most suitable unit for subsurface wastewater renovation will be named Map Unit 1.

5.9.8.3.3. The Legend must identify all symbols used on the soil map.

5.9.8.3.4. The soil map must show all lot boundaries and the location of the primary and secondary absorption areas for each lot.

5.9.8.3.5. Other features that may affect the location of subsurface onsite wastewater systems should be identified. These include but are not limited to streams, wells, pipelines (oil, gas or water) power lines, topographic features, etc. These features may be recognized by symbols and labeled on the map. If symbols are used the symbols must be defined in the legend.

5.9.8.3.6. A signed statement must be on the soil map certifying the map was made in accordance with the current National Soil Survey Standards by a Registered Professional Soil Classifier Licensed in Arkansas.

5.9.8.3.7. The following statement must be on all soil maps. Any modification such as cutting, filling or compaction of the soil may change the nature of the soils, and may alter the suitability of the soils for the intended use and will therefore void the soil map.

5.9.8.4. The Soils Report

5.9.8.4.1. The soils report is a separate document that must be submitted as an attachment to the soil map. The report should consist of the following.

5.9.8.4.2. Each map unit identified on the soils map must have a typical pedon description. Terms used in the description must be those used by the United States Department of Agriculture (USDA).

5.9.8.4.3. The range in characteristics for each soil map unit must be given. The characteristics must include but are not limited to color, texture, redoximorphic features and depth to bedrock. Ranges should be narrow enough that interpretations will not be different for soils with the same typical pedon.

5.9.8.4.4. Interpretations for each typical pedon must be included in the soils report. The minimum interpretations required include: seasonal water table duration, hydraulic conductivity classes, depth to bedrock and the soil loading rate.

5.9.8.4.5. A signed statement must be on the soils report certifying the report was made in accordance with the current National Soil Survey Standards by a Registered Professional Soil Classifier.

5.9.9. Sizing based on Seasonal Water Table loading rates without Soil Mapping

5.9.9.1. Designative Representatives utilizing soil morphology method must be soil certified. The following information or items must be included.

5.9.9.2. A minimum of one soil pit in both the primary absorption and secondary absorption area is required. Soil pit information must include depth to rock, impermeable soil layers and seasonal water tables.

5.9.9.3. Loading rates used to size primary and secondary sites must be given. The corners of both the primary and secondary absorption areas must be sized and flagged on each lot and indicated on the plans.

5.9.10. Sizing based on Percolation Test Data

5.9.10.1. A minimum of one soil pit in both the primary absorption and secondary absorption area is required. Soil pit information will include information of depth to rock, impermeable soil layers, and estimated depths to seasonal water tables.

5.9.10.2. If the soil is considered acceptable based on the information above, a minimum of one percolation hole in both the primary and secondary absorption areas is required.

5.9.10.3. Percolation rates used to size the primary and secondary site must be given. The corners of both the primary and secondary sites must be sized and flagged on each lot and indicated on the plans.

5.9.10.4. Lots sized using percolation test data must not be smaller than that required by seasonal water table loading rates.

5.9.11. ~~No~~ Construction of any type shall not begin upon ~~be done~~ any lot in the subdivision until final ~~disposition~~ approval of the submission for utilization of ~~individual sewage disposal~~ onsite wastewater systems within the subdivision has been made by the Arkansas Department of Health.

5.9.12. Property Owners' Associations that construct and maintain or have constructed and maintained ~~sewage disposal~~ wastewater treatment facilities in accordance with standards and regulations established by the ~~Division of Engineering or the Division of Environmental Health Protection of the Department of Health or the Department of Pollution Control and Ecology~~ Arkansas Department of Health or the Arkansas Department of Environmental Quality and that desire to exercise general supervision and authority over the ~~disposal of sewage~~ treatment of wastewater within and for the subdivided area over which their authority extends, may request the ~~Division of Environmental Health Protection~~ Department or in the case of ~~individual sewage disposal~~ onsite wastewater systems, or ~~the Division of~~ Engineering, in the case of community ~~sewage disposal~~ wastewater treatment systems, to delegate such parts of its authority as the Property Owners' Association wishes to exercise. The ~~Division of Environmental Health Protection or the Division of Engineering~~ Department may,

at its discretion, delegate any of its authority in the administration of these Rules and Regulations as it shall deem proper and in accordance with the following.

5.9.12.1. In the event, that such Property Owners' Association constructs and maintains all ~~individual sewage disposal~~ onsite wastewater systems within the subdivided area over which their authority extends, the ~~Division of Environmental Health Protection~~ Department, after determining by the procedure set forth in ~~C above~~ Section 5.9 that the use of the ~~individual sewage disposal~~ onsite wastewater systems within the subdivision is acceptable, may, at its discretion, delegate the Property Owners' Association general supervision and authority over the location, design, construction, installation and operation of ~~individual sewage disposal~~ onsite wastewater systems subject, however, to compliance with these Rules and Regulations and to the use of the permit forms established under these Rules and Regulations and to the final approval of each permit by the authorized agent of the ~~Division of Environmental Health Protection~~ Department.

5.9.12.2. In the event that such Property Owners' Association constructs and maintains all community ~~sewage disposal~~ wastewater treatment systems within the subdivided area over which their authority extends, ~~the Division of~~ Engineering may, at its discretion, delegate general supervision and authority over the location, design, construction, installation and operation of such community ~~sewage disposal~~ wastewater treatment systems subject to compliance with applicable Rules and Regulations of the Department of Health and of the ~~Department of Pollution Control and Ecology~~ Arkansas Department of Environmental Quality, and subject to final approval of designs and issuance of permits as required by said applicable Rules and Regulations. Such compliance shall be to the same degree and extent as would apply if the Property Owners Association were a municipality.

~~E. Septic tank systems~~

~~All septic tank systems in subdivisions or in platted or unplatted lots or tracts of land as provided in Act 402, must be planned, designed and constructed in accordance with the RULES AND REGULATIONS PERTAINING TO GENERAL SANITATION and the RULES AND REGULATIONS PERTAINING TO SEWAGE DISPOSAL SYSTEMS, DESIGNATED REPRESENTATIVES AND INSTALLERS of the Arkansas Department of Health, Division of Environmental Health Protection. Permits for construction and operation of septic tank systems must be obtained in accordance with the RULES AND REGULATIONS PERTAINING TO SEWAGE DISPOSAL SYSTEMS, DESIGNATED REPRESENTATIVES AND INSTALLERS prior to the construction, installation or modification of the septic tank system.~~

~~F. Location~~

Section 6. System Location

6.1. These distances shall be used only where ideal conditions indicate them to be sufficient, and greater distance shall be required where local conditions demand. All waivers except

with public water supplies involved must be submitted to and approved by the ~~Division of Environmental Health Protection~~ Department. Waivers affecting public water supplies must be submitted to and approved by ~~the Division of~~ Engineering. Details pertaining to local water wells, such as depth, type of construction, vertical zone of influence, etc., together with data on the geological formations and porosity of subsoil strata, should be considered in determining the safe allowable distance between wells and subsurface onsite wastewater systems.

~~All facilities used for the collection, treatment and disposal of human excreta shall be located on a suitable, well drained site, and at a safe distance from any source of water supply so as to preclude the possibility of surface or subsurface contamination reaching the water supply.~~

~~In order to meet this problem in a practical manner, certain minimum distances are given:~~

~~1. All facilities used for the treatment and disposal of human excreta must be at least 100 feet from any water supply well.~~

~~2. All facilities used for the treatment and disposal of human excreta must be at least 300 feet from any water supply intake.~~

~~These distances shall be used only where ideal conditions indicate them to be sufficient, and greater distance shall be required where local conditions demand. All waivers except with public water supplies involved must be submitted to and approved by the Division of Environmental Health Protection. Waivers affecting public water supplies must be submitted to and approved by the Division of Engineering~~.

6.2. Minimum Horizontal Distances.

6.2.1. All facilities used for the collection, treatment, and renovation of wastewater must be at least 300 feet from the high water mark of any body of water, if within one quarter mile of a public water supply intake.

6.2.2. All facilities used for the collection, treatment, and renovation of wastewater must be at least 300 feet from any spring used as a public water supply.

6.2.3. All facilities used for the collection, treatment, and renovation of wastewater must be at least 100 feet from any source of domestic water supply.

6.2.4. All facilities used for the collection, treatment, and renovation of wastewater must be at least 100 feet from the high water mark of any stream or lake.

6.2.5. All facilities used for the collection, treatment, and renovation of wastewater must be at least 50 feet from any pond on the same property and 100 feet from any pond on adjacent properties.

6.2.6. All facilities used for the collection, treatment, and renovation of wastewater must be at least 10 feet from any dwelling or building.

6.2.7. All facilities used for the collection, treatment, and renovation of wastewater must be at least 10 feet from all property lines.

6.2.8. All facilities used for the collection, treatment, and renovation of wastewater must be at least 10 feet from any water service line.

6.2.9. Provided that the tank is constructed of fiberglass or polyethylene and approved by the Department, a variance may be granted for septic tank locations that do not meet the above listed minimum horizontal distance separations.

G. ~~Disposal of wastes~~

~~The contents of all facilities used for the collection, treatment and disposal of human excreta in individual sewage disposal systems shall be disposed of by burial or burning in a suitable location and manner, or other methods approved by the Division of Environmental Health Protection of the Arkansas Department of Health~~.

~~GENERAL POLICY~~

~~The most satisfactory method of disposing of sewage in densely developed residential areas is by connection to a public sewer system. Every effort shall be made to secure sewer extensions. When a connection to a public sewer is not feasible, and when a considerable number of residences are to be served, consideration must be given to the construction of a community sewer system and treatment plant. However, since an improperly operated or inadequately staffed community sewage treatment plant cannot effectively treat wastes, consideration should be given to the size of the proposed system to insure that economically feasible sewer rates are sufficient to ensure proper treatment plant operation. Specific information on this matter may be obtained from the Division of the Department of Health.~~

~~When installation of a private residential sewage disposal system cannot be avoided, requirements of the Arkansas Department of Health, RULES AND REGULATIONS PERTAINING TO SEWAGE DISPOSAL SYSTEMS, DESIGNATED REPRESENTATIVES AND INSTALLERS as contained herein shall be followed~~.

~~SECTION I. DEFINITIONS~~

~~1.1. Alternate/Experimental Sewage System. A non-standard individual sewage disposal system or treatment system which is classified as experimental in order to evaluate its potential effectiveness.~~

~~1.2. Authorized agent. The Sanitarian assigned to the County or Local area by the Division of Sanitarian Services.~~

~~1.3 Community sewage system. Any system, whether public or privately owned, serving two or more individual lots, for the collection and disposal of sewage or industrial wastes of a liquid nature, including various devices for the treatment of such sewage or industrial wastes.~~

1.4. Curtain drain. A subsurface drainline usually constructed upgrade from the lateral lines to divert seasonal groundwater away from leaching system.

1.5. Department. The Arkansas Department of Health, the Division of Environmental Health Protection.

1.6. Designated Representative. A person designated by the authorized agent to make percolation tests, system designs and inspections subject to the authorized agent's final approval. Designated representatives shall be registered professional engineers, registered land surveyors, licensed master plumbers, registered sanitarians or other similarly qualified individuals holding current certificates from the State of Arkansas, and shall demonstrate to the satisfaction of the authorized agent prior to their designation as a "designated representative" their competency to make percolation tests, designs and final inspections for individual sewage disposal systems in accordance with these Rules and Regulations and when authorized by the Sanitarian.

1.7. Distribution box. A water tight box that receives the discharge of effluent from the septic tank and distributes the flow of sewage to each individual line of the leaching system.

1.8. Diversion device. A proprietary or individually manufactured device used to alternate the effluent load between 2 or more soil absorption systems.

1.9. Domestic sewage. All wastes discharging from sanitary conveniences and plumbing fixtures of a domestic nature, exclusive of industrial and commercial wastes.

1.10. Dosing tank. A tank constructed of concrete, plastic, fiberglass or other proved material that contains one or more pumps or automatic siphons designed to deliver a specified volume of sewage effluent to the distribution system.

1.11 Effluent line or outlet sewer. A water tight pipeline that carries the effluent from the septic tank to the distribution box.

1.12 Grease interceptor or grease trap. A device to catch or trap grease that is in suspension or solution in liquid waste and to retain the grease solids separated in the trap receptacle.

1.13. High water mark. The line which the water impresses on the soil by covering it for sufficient periods of time to deprive it of vegetation.

1.14. Homeowner. A person who owns and occupies a building as his home.

1.15. House sewer. A water tight pipeline that carries sewage and other wastes to the septic tank; sometimes called the influent line, beginning 3 to 5 feet outside the building wall.

1.16. Individual sewage disposal system. A single system of treatment tanks and/or disposal facilities used for the treatment of domestic sewage, exclusive of industrial wastes, serving only a single dwelling, office building, or industrial plant or institution.

1.17. Industrial wastes. Liquid wastes resulting from the processes employed in industrial and commercial establishments.

1.18. Installer. Any person, firm, corporation, association, municipality, or governmental agency, who constructs, installs, alters or repairs individual sewage disposal systems for others.

1.19. Mottling. Irregular spots in the soil of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage.

1.20. Municipality. A city, town. county, district, or other public body created by or pursuant to State law, or any combination thereof. Acting cooperatively or jointly.

1.21. Person. Any institution, public or private corporation, individual, partnership, other entity.

1.22. Potable water. Water free from impurities in amounts sufficient to cause disease or harmful physiological effects with the bacteriological and chemical quality conforming to applicable standards of the Arkansas State Board of Health.

1.23. Property owner. A person who owns and may or may not occupy the property.

1.24. Property owners Association. An association created by and pursuant to State law and organized for the purpose of maintaining common facilities including individual sewage disposal facilities in unincorporated subdivisions.

1.25. Restrictive soil layer. A soil layer that impedes the movement of water, air and growth of plant roots. Examples of such layers or conditions are groundwater tables, hardpans, claypans, fragipans compacted soil, bedrock and clayey soil.

1.26. Scum. The accumulated floating material, including grease and other light solids in a septic tank.

1.27. Seasonal groundwater table. Subsurface level at which water bearing strata is determined by the presence of water or by visible mottling of the soil

1.28. Septic tank manufacturer. A person, firm, corporation or association who manufactures septic tanks, package treatment plants or other components for individual sewage disposal or treatment systems.

1.29. Septic tank. A single tank or series of tanks in which two processes take place; settling of the solids, and the digestion of some of the accumulated solids by anaerobic action.

1.30. Sewage. Any liquid wastes containing animal or vegetable matter in suspension or solution, including liquid wastes from toilets, kitchen sinks, lavatories, washing machines and other plumbing fixtures.

1.31. Sludge. The settled solids at have separated from the liquid in a septic tank.

1.32. Soil absorption system. The system for the final renovation of the septic tank effluent and return of the renovated waste water to the hydrologic cycle. The leaching system includes the lateral lines or sewage disposal line, the perforated pipes, the rock material and the leaching trenches

1.33 Subdivision. Land divided or proposed to be: divided for predominantly residential purposes into such parcels as required by local ordinances, or, in the absence of local ordinances, subdivision means any land which is divided or proposed to be divided by a common owner or owners for predominantly residential purposes into three or more lots or parcels, unplatted units any of which contains less than three acres, as a part of a uniform plan of development.

1.34. Valid permit. A permit for construction is valid for a period of one year from the date of approval.

SECTION II. PLANNING THE LEACHING SYSTEM.

2.1. Public sewage versus individual sewage disposal systems. Every effort should be made to connect to an existing public sewer system. When connection to an existing system is not feasible and a large number of residences are to be built in an area, consideration should be given to the construction of a community sewer system and treatment plant. However, since an improperly operated or inadequately staffed community sewage treatment plant cannot effectively treat wastes, consideration should be given to the size of the proposed system to insure that economically feasible sewer rates are sufficient to insure proper treatment plant operation. As an aid to developers and engineers, the following information is offered to determine the feasibility of a public sewer system or individual disposal system.

POPULATION DENSITY	EQUIVALENT LOT SIZE	SERVICE ECONOMIC JUSTIFICATION
Over 5,000 persons per sq. mi.	Less than 1/2 acre	Public sewerage is justified
2,500-5,000 persons per sq. mi.	1/2 to 1 acre	Public sewerage normally is justified
1,000-2,500 persons per sq. mi.	1 to 2 acres	Public sewerage normally is not justified
less than 1,000 persons per sq. mi.	Over 2 acres	Public sewerage rarely is justified

2.2. Minimum lot sizes. The following lot sizes are required, when septic tank absorption field systems are proposed:

A. If an individual water well supply and septic tank is proposed, the lot size must be such that the well may be located at least 50 feet from any side lot lines, at least 25 feet from the front lot line, at least 100 feet from the rear lot line and at least 100 feet from any part of the septic system site proposed on the same lot and septic system sites proposed on any adjacent lots. Wells should be located up slope from septic systems if possible.

~~For the purpose of determining minimum lot size, the septic system site proposed on the lot and on any adjacent lots shall be twice the size required for installation of the sewage disposal field. However, in no case shall a septic system be approved regardless of lot size if soils are unacceptable for subsurface disposal.~~

Section 7. Minimum Lot Size

7.1. For the purpose of determining minimum lot size, all lots must have suitable primary and secondary absorption areas. The secondary absorption area is necessary in the event the onsite wastewater system located on the primary absorption area fails or is damaged. However, in no case shall a wastewater system utilizing subsurface renovation be approved regardless of lot size if soils are not suitable for subsurface renovation.

7.2. If an individual water well supply and an onsite wastewater system is proposed, the lot size must be such that the well may be located at least 50 feet from any lot line, and at least 100 feet from any part of the wastewater absorption area proposed on the same lot and wastewater absorption areas proposed on any adjacent lots. Wells should be located up slope from wastewater systems if possible. Both primary and secondary wastewater absorption areas shall conform to all set back requirements established under Section 6.2 of this regulation.

7.3. If a public water supply is proposed and an ~~individual septic tank absorption field~~ onsite wastewater system is to be used ~~for sewage disposal~~, the lot size must be such that ~~the soil absorption system may be located on a suitable sewage system site~~ a primary absorption area and a secondary absorption area are present. ~~For the purpose of determining minimum lot size, the leaching system site shall be twice as large as would be required for installation of the individual sewage disposal field and shall conform to all set back requirements established under Paragraph 2.11 of these Rules and Regulations.~~ Both absorption areas must conform to the set back requirements outlined in Section 6.2 of this regulation. However, in no case shall a ~~septic~~ subsurface onsite wastewater system be approved regardless of lot size if soils are ~~unacceptable~~ not suitable for subsurface ~~disposal~~ renovation.

2.3. ~~Existing installation. No individual sewage disposal system in existence on the effective date of these Rules and Regulations nor any individual sewage disposal system installed after the effective date of these Rules and Regulations in a subdivision, wherein individual lots have been developed or sold for use with individual sewage disposal systems for which a plat has been filed on record prior to the effective date of these Rules and Regulations shall be required to conform to more stringent specifications and requirements as to design, construction, density of improvements, lot size and installation than those standards contained in any applicable duly adopted and published regulations in effect at the time of platting of record of such subdivisions. No individual sewage disposal system to be installed on a residential lot for which the Department or its authorized agent has issued a construction permit on or before the effective date of these Rules and Regulations shall be required to conform to the design, construction and installation provisions of these Rules and Regulations. In a subdivision for which a master plan has been approved by the Department prior to the effective date of these Rules and Regulations or for which the Department has otherwise previously issued its written approval for the installation of individual sewage disposal systems and where individual~~

lots have been developed or sold in reliance upon such prior written approval, individual sewage disposal systems shall not be required to conform to more stringent specifications as to design, construction and installation than those standards in effect at the time of, or referred to, in -such prior written approval. Provided, that any individual sewage disposal system which is determined by the Division of Environmental Health Protection of the Department of Health to be a health hazard or which constitutes a nuisance due to odor or unsightly appearance, must conform with the provisions of these Rules and Regulations within 30 working days after notification that such determination has been made.

2.4. Variances. Requested variations from these Rules and Regulations will be considered and must be approved by the Division of Environmental Health Protection or its authorized agent. Submission of alternate designs for individual sewage disposal or treatment systems for sites found not suitable for standard systems is encouraged. Submission of an alternate design shall include design data as to the efficiency of operation of the proposed alternate system.

Submission of proposed alternate systems may be approved, disapproved, or approved on a trial basis for a specific period of time. Such approval or disapproval shall be at the sole discretion of the Department or its authorized agent. When alternate systems are approved such systems shall be included by amendment to these Rules and Regulations, as alternate systems approved for use under specified conditions and subject to case by case approval or disapproval by the Department or its authorized agent.

2.5. Modified standard systems. Submission of modifications to individual sewage disposal systems as described in these Rules and Regulations is encouraged if such proposed modifications will result in an improvement to the standard systems. Submission of proposed modifications shall include design data as to the extent of improvement or efficiency anticipated. Submissions of proposed modifications may be approved on a trial basis for a specified period of time or disapprove. Such trial approval or disapproval shall be at the sole discretion of the Department or its authorized agent. When a proposed modification is proven effective the Department will amend these Rules and Regulations to adopt the modification as a good management practice. An appropriate reduction in system size shall be permitted where such modification is adopted. Such amendment of these Rules and Regulations shall be at the sole discretion of the Department.

2.6. Good management practices. Good management practices are additions or modifications to standard septic tank systems which will make such systems more efficient, or which could make such systems acceptable in marginal soil conditions. Where good management practices are proposed for inclusions in systems where soils are acceptable for a standard system decreases in leaching field size as set forth below are permitted. Where good management practices are proposed for inclusion in a septic tank system which might otherwise be unacceptable due to marginal soil conditions, there shall be no decrease in leaching field size and approval of the proposed septic tank system shall be at the sole discretion of the Department or its authorized agent.

A. Dosing tanks. Where dosing tanks are provided, either integral to the septic tank or as a separate tank, a reduction of 10 percent in the leaching field size shall be permitted.

~~Where uphill leaching systems are used and because the pump tank functions as a dosing tank a reduction of ten percent in leaching field size shall be permitted.~~

~~B. Pretreatment. Aerobic pretreatment units are an acceptable substitute for a septic tank. All aerobic units installed in the state must be tested and approved by the National Sanitation Foundation and a two year renewable service contract is required with the sale of each unit.~~

C. ~~Curtain drain. (See Fig. 5. Sec. 2.12. pg. 18) Where an approved curtain drain is installed. a reduction in leaching field size of 5 percent will be permitted for septic tank systems on sloping terrain.~~

~~D. Lowering the water table. Where the application of soil drainage techniques to remove excess groundwater is proposed for septic tank system installations in soils, which have good renovation and water movement characteristics but are undesirable as leaching fields because they are sometimes saturated with groundwater no decrease in field size will be permitted but the septic tank system may be approved at the sole discretion of the Department or its authorized agent~~.

Section 8. Soil Criteria

8.1. ~~2.7 Suitability of soil.~~ The first ~~procedure~~ step in the design of ~~a subsurface sewage absorption~~ any onsite wastewater system is to determine the suitability of the soil. ~~Sewage systems using soil absorption for effluent disposal must provide renovation to protect both the public's health and subsurface water supplies~~. A minimum of 2 soil pits is required to determine the suitability of a site. One pit must be in the area of the proposed primary absorption area and one pit must be in the area of the proposed secondary absorption area. The soil pit must be left open for use by the authorized agent. Depths to seasonal water tables, bedrock (if encountered), and the type and depth of the various soil layers including both pervious and impervious strata and their relationship with the proposed soil absorption system's other impervious strata shall be reported.

~~A. Suitable soils. A suitable soil must have a percolation rate within the range specified in Table 1 and have a maximum groundwater elevation at least four (4) feet below the surface and be free of impervious soil or rock strata to a depth of four (4) feet below the bottom of the proposed absorption trench. Soils meeting these criteria generally pose few limitations to the use of septic systems~~

~~B. Marginally suitable soils. Soils that vary somewhat from the above criteria but with the use of good management practices and/or system modifications. are still capable of absorbing and adequately renovating septic tank effluent may be utilized with certain restrictions. These restrictions may include. but are not limited to increases in minimum lot size special design criteria or drainage projects. Individual sewage disposal systems on marginally suitable soils will be considered on a case-by-case basis~~.

C. ~~Unsuitable soils. Soils which significantly vary from the suitable soil criteria and cannot provide for adequate absorption, renovation, or groundwater protection are not suitable for the use of conventional septic systems. Individual isolated lots may be capable of utilizing an experimental or alternate type sewage system. These are considered on a case-by-case basis under design criteria periodically updated by the Department. As with all sewage systems. the owner is responsible for all operation and maintenance requirements. Developers proposing subdivisions on unsuitable soils should investigate the use of some type of community or public sewage treatment system.~~

~~2.8. Required tests. A soil bore or pit is necessary to determine the suitability of a soil for septic tank system. Since subsoils can vary widely in short distances, the determination must be made at the site of the proposed system. The minimum depth of the determination is to a depth from four (4) feet below the bottom of the proposed soil absorption system. The minimum information to be obtained from the determination is:~~

~~A. The type and depth of the various soil layers. This includes both pervious and impervious strata and their relationship with the proposed soil absorption system.~~

~~B. The depth to the seasonal groundwater tables. During wet periods this can be obtained by actual incasement and during dry periods the depth to indicative soil mottling is to be reported.~~

~~C. Depth to rock or strata that cannot be penetrated by conventional digging equipment.~~

~~If the subsoil appears suitable, percolation tests should be made at points selected as typical of the area in which the disposal field will be located, and at the depth of the proposed soil absorption system. These percolation tests are used to determine the size and design of the proposed soil absorption system~~

8.2. Soil Separation Distances

The following are minimum soil separation distances from the bottom of the proposed absorption trench to the true water table (aquifer) and bedrock. These conditions must be met before the soil is considered suitable for subsurface renovation.

8.2.1. True Water Tables

Moderate Hydraulic Conductivity	24 inches
High Hydraulic Conductivity	36 inches

8.2.2. Bedrock

Moderate Hydraulic Conductivity with redoximorphic features indicating SWT of moderate duration or longer	18 inches
Moderate Hydraulic Conductivity	24 inches

with no redoximorphic features or
redoximorphic features indicating
a brief SWT

High Hydraulic Conductivity 36 inches

8.3. Hydraulic Conductivity Classes

The hydraulic conductivity class may be estimated using the following.

8.3.1. High hydraulic conductivity**.** Natural soil horizons which have not been compacted by human activities, especially vehicle traffic and tillage operations, and are in the following particle size classes

Sandy**.** The texture of the fine earth is sand or loamy sand but not loamy very fine sand; very fine sand with rock fragments making up less than 35% of the volume.

Fragmental. Stones, cobbles, gravel, and very coarse sand particles; too little fine earth to fill some of the interstices larger than 1 millimeter.

Sandy-skeletal**.** Rock fragments 2 millimeters in diameter or larger make up 35% or more by volume; enough fine earth to fill interstices larger than 1 millimeter; the fraction finer than 2 millimeters is sandy as defined for the sandy particle size class.

8.3.2. Moderate hydraulic conductivity. Natural soil horizons which clearly have some soil structure other than platy, which have not been compacted by human activities, especially vehicle traffic and tillage operations, and which are in one or more of the following particle size classes

Loamy**.** The texture of the fine earth is loamy very fine sand, or finer, but the amount of clay is less than 35%; rock fragments are less than 35% by volume.

Loamy-skeletal. Rock fragments make up 35% or more by volume; enough fine earth to fill voids larger than 2 millimeters; the fraction finer than 2 millimeters is loamy as defined for the loamy particle size class.

8.3.3. Low hydraulic conductivity**.** Included are all soil horizons which have platy structure, or (clearly) fraigipan horizons or horizons which have been compacted by the human activities, especially vehicle traffic and tillage operations. Also included are horizons with the following particle size classes:

Clayey. The fine earth contains 35% or more clay by weight and rock fragments are less than 35% by volume.

Clayey-skeletal. Rock fragments make up 35% or more by volume; enough fine earth to fill voids larger than 1 millimeter; the fraction finer than 2 millimeters is clayey as defined for the clayey particle size class.

8.4. Seasonal Water Table (SWT) Classes

The depth to seasonal water tables of 3 durations can be estimated from the following guides. The guides are interpretations of redoximorphic features, a type of soil morphology which results from reduction-oxidation processes. All colors are for moist conditions. Place each horizon in the most limiting class in which it will fit.

The placing of soil horizons into SWT classes based on redoximorphic features is an interpretation and requires some understanding of soil development processes. Redoximorphic features are not expected to occur unless the horizon has been both saturated and reduced. Reduction is not expected to occur until after the horizon has been saturated for some period of time.

8.4.1. Horizons with dissimilar color patterns on ped surfaces and ped interiors

8.4.1.1. Brief**:** Soil horizons which have seasonal water tables of brief duration contain one or more of the following.

Concentrations or depletions on ped surfaces with chroma ≥ 3, not greater than 50% or more chroma 3 on ped surfaces.

Manganese masses on 2% or more of the ped surface

Iron or manganese nodules or concretions 2 millimeters in diameter or larger

Note: Iron/Manganese nodules or concretions with clear to sharp boundaries and the absence of iron/manganese accumulations on the surface of the nodule or concretion are not indicative of contemporary seasonal water table levels.

8.4.1.2. Moderate**:** Soil horizons which have seasonal water tables of moderate duration contain one or more of the following.

Some chroma ≤ 2 on ped surfaces

50% or more chroma 3 on ped surfaces

35 to 49% clay

8.4.1.3. Long: Soil horizons which have seasonal watertables of long duration contain one or more of the following.

Chroma ≤ 2 on 70% or more of the ped surfaces

Chroma ≤ 2 on 50% or more of the ped surfaces with some chroma of 2 or less in ped interiors

50% or more clay

8.4.2. Horizons with similar color patterns on ped surfaces and ped interiors and horizons without peds

8.4.2.1. Brief: Soil horizons which have seasonal water tables of brief duration contain one or more of the following

Concentrations or depletions with chroma ≥ 3, not greater than 20% chroma 3

Iron or manganese nodules or concretions 2 millimeters in diameter or larger

Note: Iron/Manganese nodules or concretions with clear to sharp boundaries and the absence of iron/manganese accumulations on the surface of the nodule or concretion are not indicative of contemporary seasonal water table levels.

8.4.2.2. Moderate**:** Soil horizons which have seasonal water tables of moderate duration contain one or more of the following.

Chroma ≤ 2 on less than 50% of the mass

Chroma 3 in more than 20% of the mass

35 to 49% clay

8.4.2.3. Long**:** Soil horizons which have seasonal water tables of long duration contain one or more of the following.

Chroma ≤ 2 in 50% or more of the mass

50% or more clay

8.4.3. Soil horizons that have chroma and value of ≤ 3 due to high organic matter contents (A horizons) present problems for SWT interpretations. Also uncoated grains which result from prolonged leaching with organic acids (E horizons) are not considered to be an indication of a SWT. These horizons (A and E) shall be considered to contain SWT's only if they also contain high or low chroma colors. A plowed horizon (Ap), which has chroma of 3 or less, shall not be considered to contain an SWT unless the first underlying horizon contains an SWT. The duration of the SWT in a plowed horizon (Ap) with chroma ≤ 3 and in A and E horizons with chroma ≤ 3 and high or low chroma colors shall be the same as in the first underlying horizon.

8.4.4. Soils with 35% or more clay that are low or moderate shrink-swell, with a value of 5YR or redder typically formed over sandstone, siltstone, limestone, and chert may have higher hydraulic conductivities and seasonal water tables of shorter duration than indicated by the above characteristics. These soils will be considered moderate hydraulic conductivity and sized according to redoximorphic features. Alluvial soils

such as those deposited by the Arkansas and Red Rivers and soils formed from shale are high shrink-swell and are not included in this exception.

8.4.5. Some soils may exhibit redoximorphic features that are not indicative of current soil conditions. In such soils, monitoring wells or piezometers may be necessary to determine current soil wetness conditions. Monitoring must be done during the wet season.

8.4.6. Monitoring Requirements

8.4.6.1. A property owner or their representative has the option to use observation wells and/or piezometers to demonstrate that redoximorphic features are not an indication of zones of saturation. The following procedures for the use of observations wells/piezometers to determine the depth and duration of seasonal water tables shall be implemented.

8.4.6.2. The property owner or their representative shall notify the Department, in writing, of the intent to use observation wells and/or piezometers to determine the seasonal water tables.

8.4.6.3. At least 3 observation wells and/or piezometers shall be installed and monitored on a site within both the proposed primary and secondary absorption areas. If in the judgment of the Department, more than 3 are needed, the property owner or their representative shall be notified.

8.4.6.4. The wells and/or piezometers shall extend at least 60 inches into the natural soil. The Department reserves the right to determine the depth of all well and/or piezometers.

8.4.6.5. All plans and specifications for observation wells/piezometers shall be submitted and installed under the supervision of a Professional Soil Classifier. NOTE: Individuals submitting monitoring plans must have demonstrable training and/or experience in monitoring of seasonal water tables.

8.4.6.6. Monitoring of seasonal water tables shall be conducted by a Professional Soil Classifier or Designated Representative.

8.4.6.7. Under no circumstances will the property owner/developer be allowed to monitor the water levels.

8.4.6.8. The monitoring period is from December 1st through May 15th of the following year to verify the depth and duration of the seasonal water tables during years of normal precipitation for this time period. Depending on when peaks are observed, the Department may or may not accept the monitoring for the time period. A near normal reporting period is defined as a period that has plus or minus one standard deviation of the long term mean annual precipitation. (Long term refers to 30 or more years.) Also, the mean monthly precipitation during a normal period must be plus or minus one standard deviation of the long term monthly precipitation for 8 of the 12 months. For

the most part, normal years can be calculated from the mean annual precipitation.

8.4.6.9. The Department shall field check the monitoring periodically during the time of expected saturated soil conditions at its discretion.

8.4.6.10. The Department may, at any time during the observation period, verify the observed water depth by conducting a soil boring next to, and of equal depth with, any of the observation wells/piezometers. The well may be declared invalid by the Department if the water level after 24 hours without precipitation, presents a discrepancy with the observed water level in the data collected. The owner will be notified by the Department of such findings.

8.4.6.11. When monitoring determines that the site is suitable, the Department will request that a new site evaluation be submitted. The monitoring information must be incorporated into the new site evaluation.

8.4.6.12. Some soils have been extensively studied and have no contemporary seasonal water tables. These specific areas may be exempted from the soil redoximorphic features but must be sized by Hydraulic Conductivity or percolation rates. Only specific areas recognized by the Department may be exempted without the monitoring requirements outlined in this regulation.

8.4.7. Lowering Seasonal Water Tables

8.4.7.1. Interceptor Drains. Interceptor drains can be utilized to lower or eliminate the brief seasonal water table on sites with 3% or more slope in portions of the soil that have moderate or high hydraulic conductivity. Approval of any reduction in seasonal water table depth is at the sole discretion of the Department or its authorized agent.

8.4.7.2. Capping Fill. The depth of the observed seasonal water table may be increased by a factor equal to half the depth of the settled fill applied to the absorption area as outlined in Section 9.7 of this regulation. Systems incorporating capping fills must be loaded to the surface of the settled cap in order to utilize the adjustment credited for the applied cap.

8.5. Prior to adjustment for capping fill, where the slope is less than or equal to 12%, all undisturbed soils exhibiting a depth of 9 inches or greater to a brief seasonal water table, and/or a depth of 13 inches or greater to an adjusted moderate seasonal water table, and/or a depth of 21 inches or greater to an adjusted long seasonal water table must utilize a subsurface onsite wastewater systems as outlined in this regulation.

8.6. Where the slope is greater than or equal to 12%, all undisturbed soils exhibiting a depth of 12 inches or greater to a brief seasonal water table, and/or a depth of 16 inches or greater to an adjusted moderate seasonal water table, and/or a depth of 21 inches or greater to an adjusted long seasonal water table must utilize a subsurface onsite wastewater system as outlined in this regulation.

Section 9. Standard Systems

9.1. A standard onsite wastewater system consists of a field of perforated pipe surrounded by gravel, or other product approved by the Department and installed in such a manner that the clarified effluent from the septic tank or pretreatment unit will be distributed with reasonable uniformity into the natural soil. The individual absorption trench should not be more than 60 feet long, with a maximum length of 100 feet, and the trench bottom and distribution lines should be installed at a grade of 0 to 2 inches per 100 feet and must not exceed 4 inches per 100 feet. In order to ensure even distribution of the effluent, all onsite wastewater systems utilizing a distribution box must have absorption trenches of the same length. Onsite wastewater systems utilizing serial distribution of the effluent must be provided with an approved diversion device to allow drying of the most used absorption trenches. The most used absorption trench should be allowed to drain and dry out during the summer months. In all cases, a minimum of 2 absorption trenches is required to ensure that the absorption area will function even if one absorption trench is disturbed.

9.2. Many different designs may be used in laying out absorption trenches. The choice may depend on the size and shape of the available absorption area, the area required, and the topography of the absorption area.

9.3. Soil absorption areas utilizing pipe and gravel provide for a trench 24 inches wide, with a standard trench depth of 18 inches from the bottom of the trench to the finished settled grade. Systems designed with trench depths up to 24 inches may be utilized. There shall be a minimum of 6 inches of gravel below the pipe and a minimum of 2 inches of gravel above the pipe. A minimum of 6 inches of cover is required above the gravel bed or gravel substitute. The trench depth may vary in those instances where the soil absorption area was designed to overcome limiting soil characteristics. Trench depths must be specifically called for in the Designated Representative's design and approved by the authorized agent. The absorption area in square feet is twice the total length of the trenches. The minimum spacing between the trenches shall be 6 feet between the trenches and 8 feet center to center. Increased separation between trenches is encouraged to enhance the effectiveness of the trenching system.

9.4. All gravel substitute products approved by the Department must be a minimum of 8 inches in height and may not exceed 24 inches in width.

9.5. Sizing the Absorption Area

If the ~~sub~~soil ~~appears suitable~~ is acceptable for the installation of subsurface absorption trenches, a percolation test~~s~~ or a seasonal water table determination ~~should~~ shall be made at points selected as typical of the area in which the ~~disposal field~~ absorption trenches will be located, ~~and at the depth of the proposed soil absorption system. These percolation tests are used to determine the size and design of the proposed soil absorption system~~. Only a Soil Qualified Designated Representative may design subsurface absorption systems based on seasonal water table data.

9.5.1. Sizing the system based on Seasonal Water Table Data

When a seasonal water table of more than one duration is present in a soil, the loading rate is determined as follows.

Determine the depth of each seasonal water table.

Adjusting the moderate seasonal water table:

Subtract the depth to the brief SWT from the depth to the moderate SWT and divide by 3;

Subtract the above number from the depth to the moderate SWT to obtain the adjusted moderate SWT.

Adjusting the long seasonal water table:

Subtract the adjusted moderate SWT from the depth to the long SWT and divide by 2;

Subtract the above number from the depth to the long SWT to obtain the adjusted long SWT;

Adjusting the long seasonal water table where only brief and long seasonal water tables are encountered:

Subtract the depth to the brief SWT from the long SWT and divided by 6;

Subtract the above number from the depth to the long SWT to obtain the adjusted long SWT.

Compare the loading rates for the brief, adjusted moderate and adjusted long duration seasonal water table using the soil loading charts.

Use the most restrictive loading rate to determine the size of the absorption area.

Soils that only have one duration of seasonal water table are loaded by using the loading rate given in the soil loading charts for the duration of seasonal water table observed.

9.5.2. From the data obtained above, a soil absorption system may be sized using the loading formula in Appendix B.

~~2.8.1 Making of percolation tests. Percolation tests must be made by Designated Representatives~~

9.5.3. Sizing the soil absorption area based on Percolation Data

9.5.3.1. ~~2.9~~ Procedures of percolation tests

9.5.3.1.1. ~~A.~~ Number and location of tests. Three (3) or more test~~s shall be made on each lot in separate test holes spaced uniformly over the proposed absorption field site.~~ holes spaced uniformly over the primary absorption area and one (1) test hole in the secondary absorption area are required. Percolation tests shall be performed at the depth of the proposed soil absorption system.

9.5.3.1.2. ~~B.~~ Type of test holes. The depth of a standard percolation test hole is ~~twenty-four (24)~~ 18 inches and the diameter may be from ~~four (4)~~ 4 to ~~twelve (12)~~ 12 inches. If soil and site characteristics indicate that a deeper or shallower system is desired, then the percolation test shall be run at the depth of the bottom of the proposed absorption trench.

~~Note: Percolation tests conducted at other than standard depth must be accompanied by results from standard tests to be used in determining absorption area required~~.

9.5.3.1.3. ~~C.~~ Preparation of test holes. Carefully scratch the bottom and sides of the holes with a knife blade or sharp-pointed instrument, in order to remove any smeared soil surfaces and to provide a natural soil interface into which water may percolate. Remove all loose material from the holes. Add 2 inches of coarse sand or fine gravel to protect the bottom from scouring and sediment.

9.5.3.1.4. ~~D.~~ Saturation and swelling of the soil. It is important to distinguish between saturation and swelling. Saturation means that the void spaces between soil particles are full of water. This can be accomplished in a short period of time. Swelling is caused by intrusion of water into the individual soil particles. This is a slow process, especially in clay-type soil, and is the reason for requiring a prolonged soaking period. To conduct the test, carefully fill the holes with clear water to a minimum depth of 12 inches above the gravel and maintain at this level for ~~four (4)~~ 4 hours, preferably overnight. This may be achieved by the use of an automatic siphon. This procedure is to ensure that the soil is given time to swell and to approach the condition it will be in during wet seasons of the year.

~~E. Percolation rate measurement~~.

9.5.3.1.5. ~~1.~~ After the saturation period, adjust the depth of water in the holes to 6 inches above the gravel. From a fixed reference point, measure the drop in water level at the end of a 30-minute period, refilling 6 inches above the gravel as necessary. The drop of water level that occurs during the 30-minute period is used to calculate the percolation rate. ~~(See Figure 1.)~~

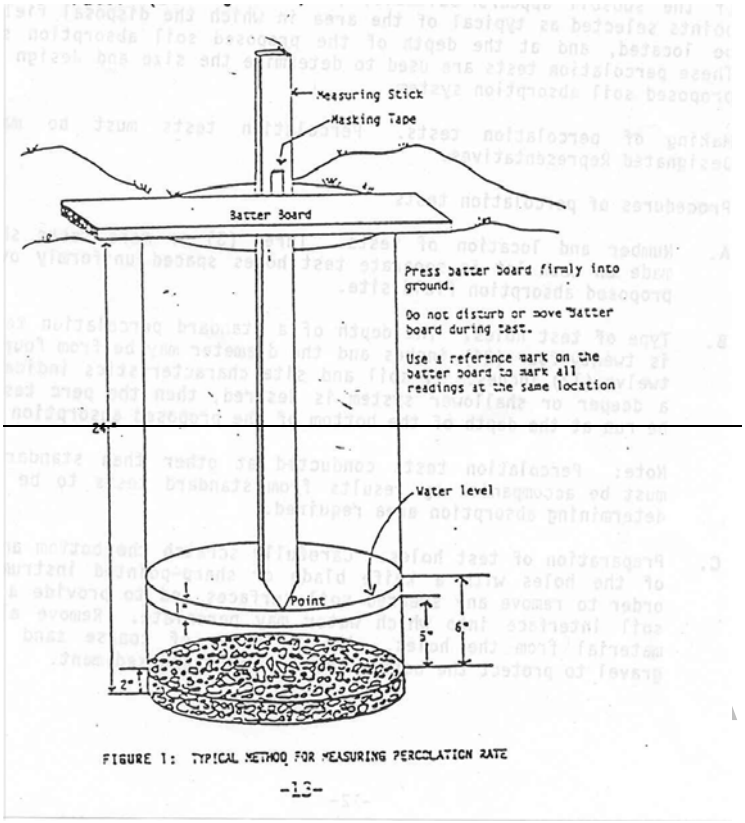

FIGURE 1: TYPICAL METHOD FOR MEASURING PERCOLATION RATE

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9.5.3.1.6. ~~2.~~ In ~~sandy~~ soils ~~(or other soils~~ in which the first 6 inches of water seeps away in less than 30 minutes after the 4-hour~~s~~ or greater saturation period~~)~~, the time interval between measurements shall be taken at 10 minutes and the test run for one hour. The drop that occurs during the final 10 minutes is used to calculate the percolation rate.

9.5.3.2. ~~2.10 Absorption area.~~ The size of the absorption area may be determined from the results of the percolation test and the data in ~~Table 1.~~ Appendix A. ~~For locations where the percolation rates are acceptable, the next procedure after making the percolation test is to determine the required absorption area from the data in TABLE 1, and to design a leaching system that will be satisfactory. As noted in TABLE 1, soil in which the percolation rate is less than one inch in 75 minutes is unsuitable for a standard soil absorption disposal system. Approval of alternate systems or of systems utilizing one or more good management practices shall be at the sole discretion of the Department or its authorized agen~~t. As noted in Appendix A, soil in which the percolation rate is greater than 75 minutes per inch (mpi) is unsuitable for a standard soil absorption system.

9.5.3.3. The size of the absorption area for a system sized using percolation rate data shall not be smaller than that required by seasonal water table data for the same site.

TABLE 1

ABSORPTION AREA REQUIREMENTS FOR RESIDENCES/COMMERCIAL ESTABLISHMENTS

PERCOLATION RATE (Minutes required for water to drop 1 inch in prepared test hole)	RESIDENTIAL ABSORPTION AREA (Required square footage per bedroom)	COMMERCIAL ABSORPTION AREA (Required square footage per gallon of effluent per day)
*10 -15	190	1.2
16 -20	210	1.4
21 -25	230	1.6
26 -30	250	1.7
31 -35	267	1.8
36 -40	283	1.9
41 -45	300	2.0
**46 -50	315	2.1
51 -55	330	2.2
56 -60	345	2.4
61 -65	360	2.5
66 -70	375	2.6
71 -75	390	2.7

* All sites demonstrating a percolation under 10 mpi require special investigation by the authorized agent.

** All soil absorption systems installed in soils demonstrating a percolation rate above 45 minutes per inch must incorporate a diversion device.

TABLE 2

QUANTITIES OF SEWAGE FLOW FOR VARIOUS TYPES OF ESTABLISHMENTS

TYPE OF ESTABLISHMENT	GALLONS PER PERSON PER DAY (Unless otherwise noted)
Airports (per passenger)	5
Camps	
Campground with central comfort stations	35
With flush toilets, no showers	25
Construction camps (semi-permanent)	50
Day camps (no meals served)	15
Resort camps (night and day) with limited plumbing	50
Luxury camps	100
Churches	5
Cottages and small dwellings with seasonal occupancy	50
Country clubs (per resident member)	100
Country clubs (per non-resident member present)	25
Dwellings	
Boarding houses	50
Additional or non-resident boarders	10
Multiple family (apartments)	65
Rooming houses	40

Single family	75 to 100
Factories (gallons per person, per shift, exclusive of industrial waste)	20
Hospitals (per bed space)	250
Hotels with private bath (2 persons per room)	60
Hotels without private bath	50
Institutions other than hospitals (per bed space)	125
Mobile home parks (per space)	300
Motels with bath, toilet and kitchen wastes (per bed space)	65
Motels (per bed space)	50
Picnic parks (toilet wastes only; per picnicker)	5
Picnic parks with bathhouses, showers and flush toilets	10
Restaurants (kitchen wastes per meal served)	4
Restaurants (additional for bars and cocktail lounges)	2
Restaurants (toilet and kitchen wastes per patron	10
Schools	
Boarding	100
Day, without gyms, cafeteria or showers	15
Day, with gyms, cafeteria and showers	30
Day, with cafeteria but without gyms or showers	20
Service stations (per vehicle served)	10
Swimming pools and bathhouses	10
Theaters	
Movie (per auditorium space)	5
Drive in (per car space)	5
Travel trailer parks without individual water and sewer hook-ups (per space)	75
Travel trailer parks with individual water and sewer hook-ups (per space)	150
Workers	
At schools, offices, commercial establishments	15

2.11 Location. The plan of the leaching system will be dependent to some extent on the location of the system in the area under consideration a safe distance should be maintained between an individual sewage disposal system and any source of water supply. Since the distance that pollution will travel underground depends on numerous factors, including the characteristics of the subsoil formations and the quantity of sewage discharged, it is not practical to specify minimum safe distances that would be reasonable in all conditions and geological formations. The greater the distance, however, the greater the safety from contamination. (See fig. 2.)

Details pertaining to local water wells, such as depth, type of construction, vertical zone of influence, etc., together with data on the geological formations and porosity of subsoil strata, should be considered in determining the safe allowable distance between wells and subsurface disposal systems.

The location of all subsurface absorption systems shall meet the following:

~~TABLE 3~~

~~MINIMUM HORIZONTAL DISTANCE REQUIREMENTS~~

~~A. Public water supply intake -High water mark……..300 feet~~
~~B. Any source of domestic water supply……...100 feet~~
~~C. Streams, lakes and ponds -High water mark. ……...100 feet~~
~~D. Dwellings…… 10 feet~~
~~E. Large trees. ……10 feet~~
~~F. Property lines…….. 10 feet~~
~~G. Water lines……...10 feet~~

~~2.12 Leaching system. A soil absorption system or the subsurface leaching system consists of a field of perforated pipe surrounded by gravel and laid in such a manner that the clarified effluent from the septic tank or pretreatment unit will be distributed with reasonable uniformity into 'the natural soil. The individual laterals preferably should not be more than 60 feet long, with a maximum length of 100 feet, and the trench bottom and distribution lines should be laid at a grade of 2 inches per 100 feet and never to exceed 4 inches per 100 feet. In order to insure even distribution of the effluent, all leaching systems utilizing a distribution box must have lateral lines of the same length. Leaching systems utilizing serial distribution of the effluent must be provided with an approved diversion device to allow drying of the most used laterals. The most used laterals should be allowed to drain and dry out during the summer months. In all cases, a minimum of two laterals are required to insure that some of the leaching system will function even if one lateral is disturbed.~~

~~Many different designs may be used in laying out subsurface disposal fields. The choice may depend on the size and shape of the available disposal area, the area required, and the topography of the disposal site. Typical layouts are illustrated in FIGURE 3. and FIGURE 4. Enlarged details or sections of a trench are shown in FIGURE 6.~~

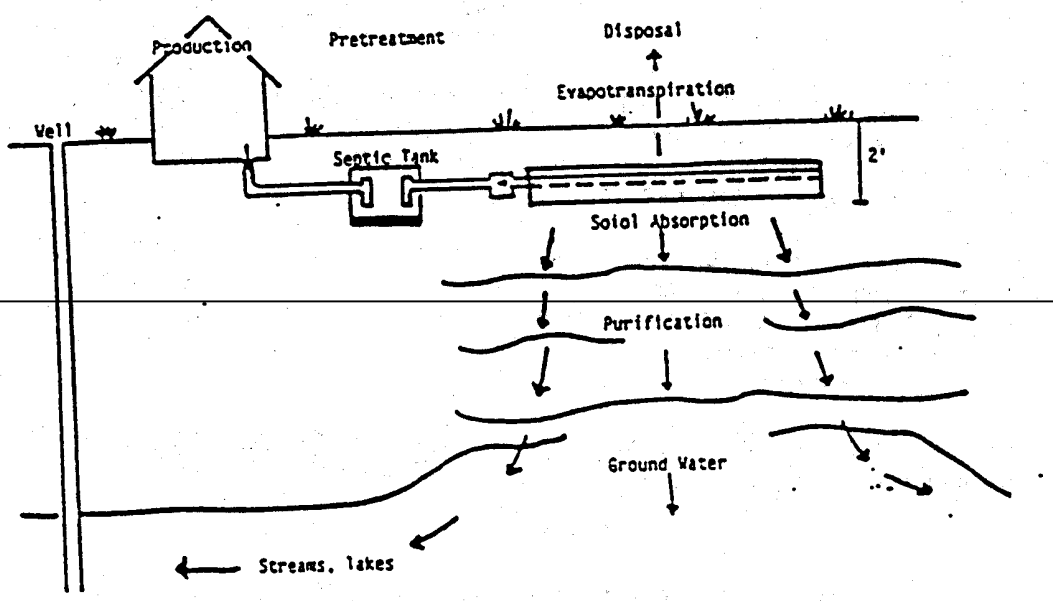


FIGURE 2: CROSS-SECTION THROUGH CONVENTIONAL SEPTIC TANK/SOIL ABSORPTION SYSTEM

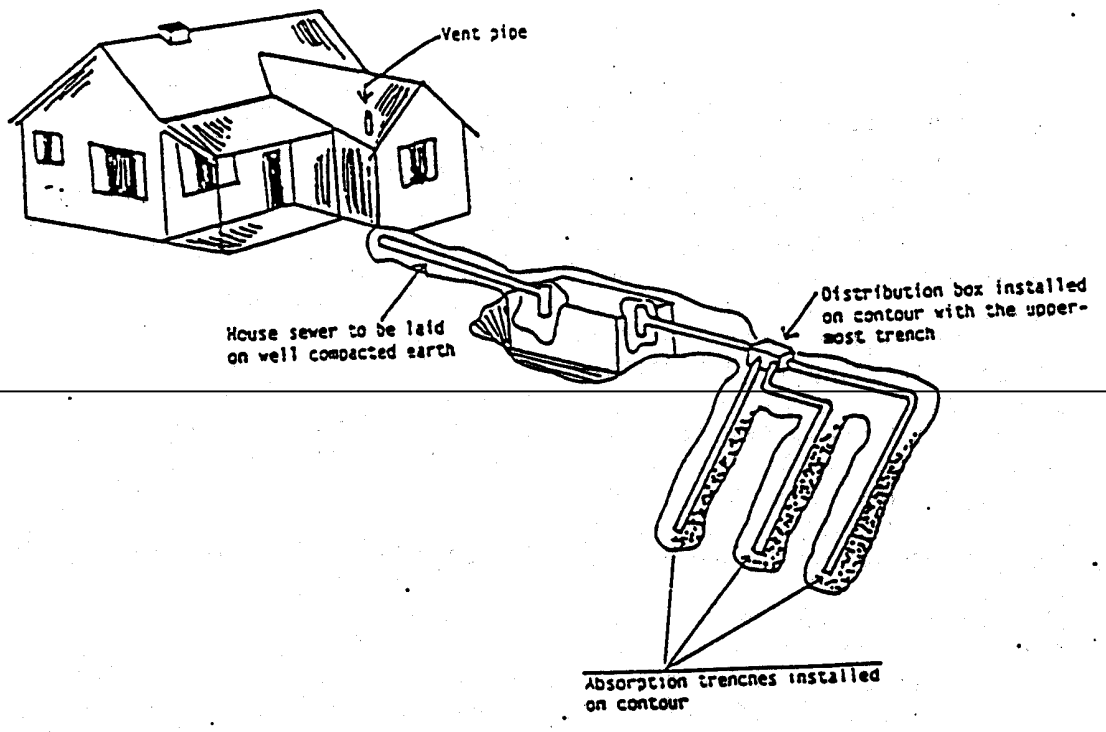


FIGURE 3: TYPICAL HILLSIDE SEPTIC TANK/ABSORPTION FIELD INSTALLATION

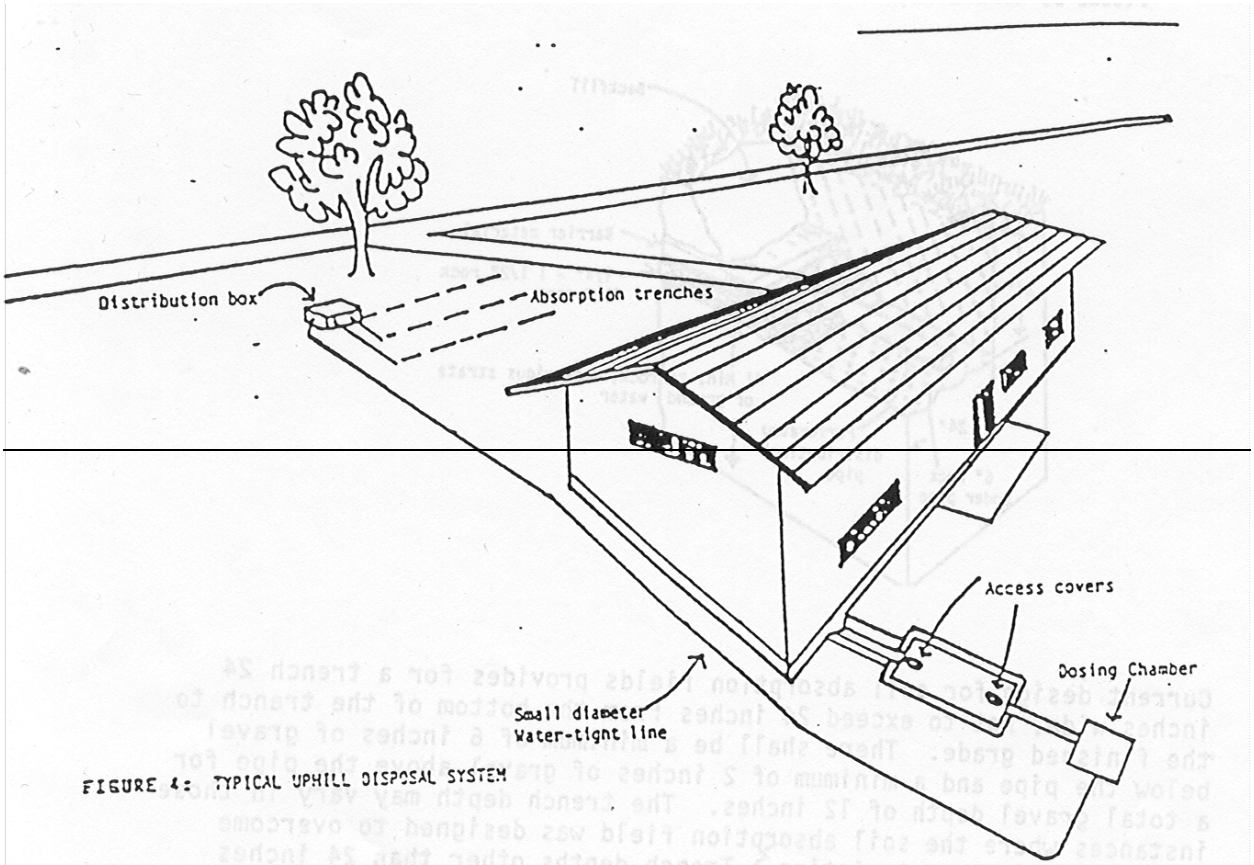


FIGURE 4: TYPICAL UPHILL DISPOSAL SYSTEM

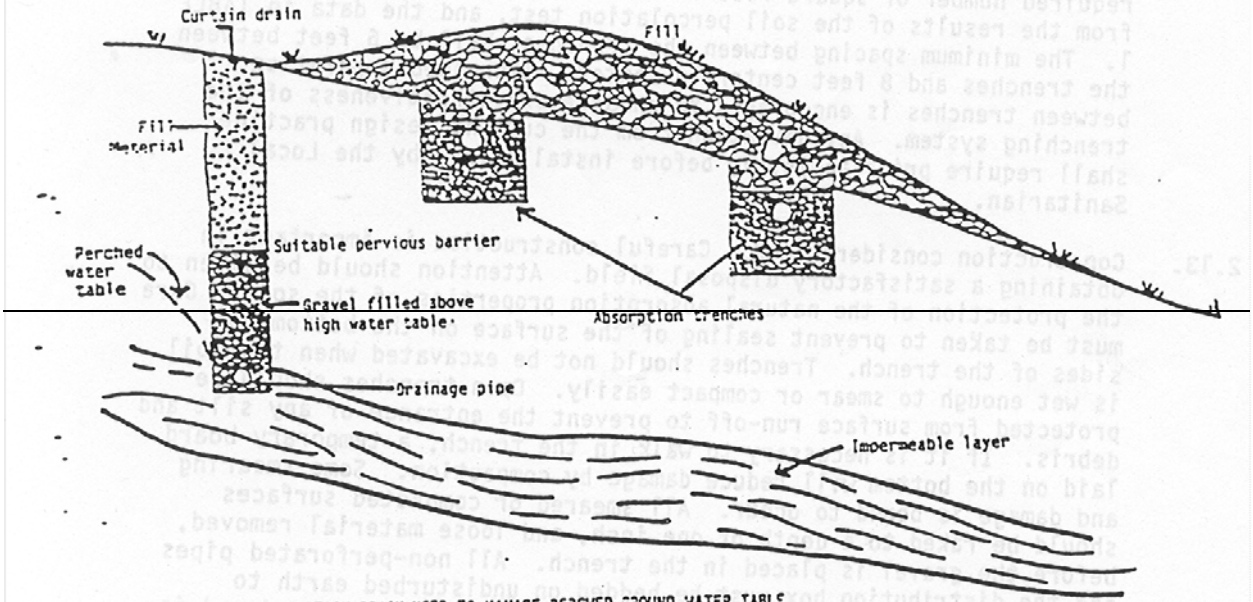
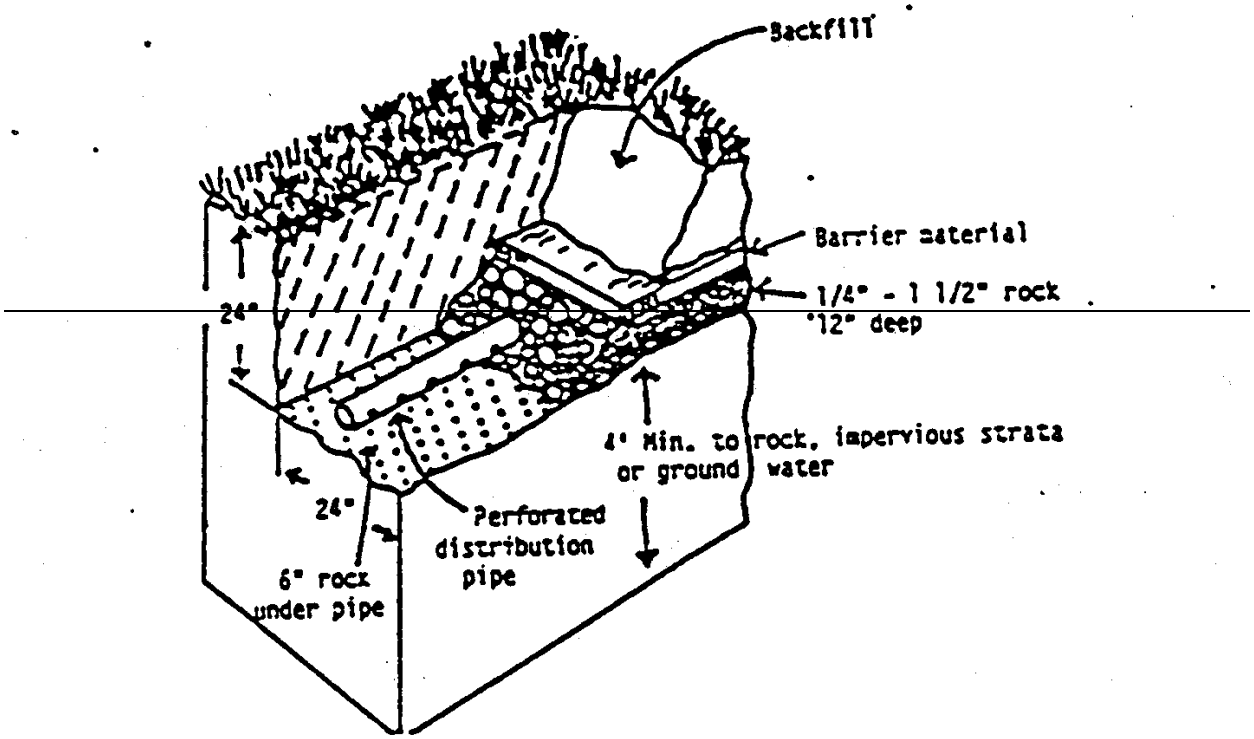


FIGURE 5: CURTAIN DRAIN USED TO MANAGE PERCHED GROUND WATER TABLE

FIGURE 6: ISOMETRIC SECTION OF A TYPICAL SOIL ABSORPTION TRENCH



~~Current design for soil absorption fields provides for a trench 24 inches wide, not to exceed 24 inches from the bottom of the trench to, the finished grade. There shall be a minimum of 6 inches of gravel below the pipe and a minimum of 2 inches of gravel above the pipe for a total gravel depth of 12 inches. The trench depth may vary in those instances where the soil absorption field was designed to overcome limiting soil characteristics.' Trench depths other than 24 inches must be specifically called for in the Designated Representative's design and approved by the authorized agent. The absorption area in square feet is two times the total length of the trenches. The required number of square feet in the absorption area is determined from the results of the soil percolation test, and the data in TABLE 1 The minimum spacing between the trenches shall be 6 feet between the trenches and 8 feet center to center. Increased separation between trenches is encouraged to enhance the effectiveness of the trenching system. Any deviation from the current design practice shall require prior approval, before installation, by the Local Sanitarian~~.

9.6. Serial Distribution

9.6.1. Proper design of serial loading only allows storage to the top of the gravel or gravel substitute on the upper lines of the system. Utilization of the loading charts when designing serial distribution is a misapplication of the storage principle. When utilizing soil morphology to design serial distribution the Lost Storage Formula in Appendix E will be utilized.

9.6.2. Serial distribution systems designed under percolation test shall not be smaller than required by seasonal water table data and the lost storage formula in Appendix E.

9.7. Capping Fill Systems

9.7.1. Soil absorption systems shall not be installed entirely in fill material. However, fill material may be used as a cap over the natural soil surface to increase the volume available for the storage of effluent.

9.7.2. Where capping fill is incorporated in the design of an onsite wastewater system, the distribution system shall be capable of storing effluent to the top of the settled cap.

9.7.3. Where capping fill is incorporated in the design of an onsite wastewater system in order to adjust seasonal water tables, the absorption trenches must be trenched into the natural soil a minimum of 4 inches. Capping fill may not exceed a settled elevation of 14 inches above the natural soil surface. Systems utilizing capping fill shall have a minimum 6 inches of settled cover above the gravel bed or gravel substitute.

9.7.4. The slope of the absorption area cannot exceed 12%. Submitted plans must indicate both the original and the finished elevations referenced to a benchmark.

9.7.5. The fill must extend a minimum of 10 feet beyond the edge of the absorption trench then graded at a three to one or less slope. The fill area must be seeded and watered regularly to prevent erosion.

9.7.6. The fill material used must be a uniform loamy soil with maximum clay content of 27%. The depth of fill above the original ground surface is measured after settling. Loamy soils can be expected to settle 25%.

9.7.7. The absorption area and borrow site must be scarified to destroy and remove the vegetative material. The absorption area must be tilled to a minimum depth of 4 inches. Stumps should be left in place at the absorption area to prevent extensive disruption of the soil.

9.7.8. Inspection ports may be provided at the end of each absorption trench.

9.8. Dosing Standard Systems

9.8.1. All components and specifications of dosed systems shall be submitted for approval to the Department or its authorized agent in accordance with the Department's Guidelines for Submittal of Onsite Wastewater System Applications.

9.8.2. Serial distribution systems shall not be approved for dosing situations.

9.8.3. Where a pump or dosing siphon is used to dose an onsite wastewater system, it shall have a capacity sufficient to deliver the required dose volume. Pump controls

shall operate automatically and be sufficiently adjustable to deliver the required dose volume.

9.8.4. Only effluent quality pumps shall be utilized in dosing applications. Dewatering and grinder pumps are not approved for septic applications.

9.8.5. Effluent shall be dosed to the absorption area at a rate not greater than twenty-five (25) percent of the estimated daily usage outlined in Appendix C of this regulation.

9.8.6. A visible and audible high water alarm shall be required for all electrical dosing situations.

9.8.7. Stand alone dosing tanks shall have a capacity sufficient to contain the required dose, storage for ballast not less than one quarter of the dose tank capacity, and emergency storage above the high water alarm not less than one third of the estimated daily usage.

9.8.8. The compartment of combination tanks used for dosing shall have a capacity sufficient to contain the required volume.

9.8.9. Pre-cast dosing tanks shall meet the same construction requirements for pre-cast septic tanks outlined in Section 11.5 of this regulation.

9.8.10. The approval of any distribution device utilized in dosing situations shall be at the sole discretion of the Department or its authorized agent.

9.8.11. Dosing from a Septic Tank

9.8.11.1. When dosing from the septic tank, the tank capacity shall be increased by not less than two hundred 250 gallons above that specified in Appendix D of this regulation.

9.8.11.2. A pump vault approved by the Department for use in septic tanks shall be incorporated into all systems designed to be dosed from a septic tank.

9.8.11.3. The pump vault shall be securely mounted to the tank in a manner that prevents movement of the vault during operation.

9.8.11.4. The minimum horizontal separation between the inlet baffle of the septic tank and the pump vault shall be 3 feet.

9.8.11.5. When a system is dosed from a septic tank, the drawdown per dose cycle shall not be greater than 3 inches.

9.8.12. Electrical Connections

9.8.12.1. All electrical connections shall be complete at the time of final system inspection unless otherwise specified by the Department's authorized agent.

9.8.12.2. All system wiring shall be encased in electrical conduit.

9.8.12.3. All splices within system wiring shall be made with heat shrink connectors or waterproof wire nuts.

9.8.12.4. All electrical connections shall be made inside watertight splice boxes.

9.8.12.5. All conduit and connection boxes shall be sealed with electrical grease or other waterproof electrical sealant in order to minimize corrosion due to moisture and/or gasses escaping the system.

9.8.12.6. All system wiring shall comply with the Arkansas State Electrical Code.

9.9. Low Pressure Distribution (LPD)

Low pressure distribution allows an absorption area or secondary treatment filter to be dosed evenly across the entire area. The discharge assembly of LPD systems consists of small diameter piping with orifices drilled at predetermined intervals through which effluent is dosed to the absorption area or secondary treatment filter. All LPD systems shall meet the following requirements.

9.9.1. All piping in LPD systems shall be constructed of schedule 40 PVC pipe. All joints or connections shall be primed and welded with the appropriate chemical agents.

9.9.2. Orifices may range in size from 0.125 (1/8) inch to 0.1875 (3/16) inch. All orifices shall be centered in the pipe, pointed up, and shielded. In situations where the discharge assembly is located at a lower elevation than the pump, 25% of the orifice should be turned down to allow the system to drain between doses. For soils with high hydraulic conductivity, the orifice spacing shall not exceed 24 inches. For soils with moderate hydraulic conductivity, the orifice spacing shall not exceed 48 inches. Orifices shall not be installed within twelve inches of the manifold pipe.

9.9.3. In situations where the discharge assembly is located at a lower elevation than the pump, a 0.25 (1/4) inch siphon-breaker hole shall be drilled in the pump effluent line above the high water level to prevent siphoning. An extra 2 gallons per minute shall be added to the system flow rate to accommodate the siphon-breaker hole.

9.9.4. The orifice head (height of squirt) shall not be less than 5 feet.

9.9.5. The dose rate shall not exceed 0.5 gallons per orifice.

9.9.6. Plastic or brass valves, either globe or gate, shall be installed between the manifold and distribution laterals in order to facilitate orifice head adjustment. Valves may not be required on secondary treatment filters. All valves shall be encased in readily accessible valve boxes or similar encasement.

9.9.7. A 90 degree sweep with threaded cleanout or valve shall be installed at each end of the laterals for maintenance. All cleanouts shall be encased in readily accessible valve boxes or similar encasement.

9.9.8. LPD absorption trenches shall contain a minimum of 8 inches of gravel and 4 inches of cover above the gravel bed.

9.10. Construction Considerations

9.10.1. ~~2.13. Construction considerations.~~ Careful construction is important in ~~obtaining~~ constructing a satisfactory ~~disposal field~~ absorption area. Attention should be given to the protection of the natural absorption properties of the soil. Care must be taken to prevent sealing of the surface on the bottom and sides of the trench. Trenches should not be excavated when the soil is wet enough to smear or compact easily. Open trenches should be protected from surface run-off to prevent the entrance of any silt and debris. If it is necessary to walk in the trench, a temporary board laid on the bottom will reduce damage by compaction. Some smearing and damage is bound to occur. All smeared or compacted surfaces should be raked to a depth of one inch, and loose material removed, before the gravel is placed in the trench. All non-perforated pipes and the distribution box must be bedded on undisturbed earth to prevent settling, ~~Where perforated non-metallic pipe is used and is assembled with collars at each joint to prevent uneven settlement, the grade board may be deleted upon approval of the authorized agent and replaced by grade stakes firmly driven in the center of the trench and on 4-1/2 foot maximum centers. The trench shall be uniformly sloped from one inch to four inches per 100 feet to assure a uniform grade.~~ and ~~T~~he ~~distribution~~ lateral lines shall be surrounded by clean, graded gravel, washed rock, or other approved ~~similar~~ aggregate. The material may range in size from 1/4 inch to 1-1/2 inches.

9.10.2. Cinders, broken shell and similar material are not approved. They are usually too fine and may lead to clogging of the absorption system, ~~(The minimum acceptable aggregate depth in a soil absorption system is 12 inches.) The material should extend from at least two inches above the top of the -pipe to at least six inches below the bottom of the pipe.~~ The top of the gravel should be covered with untreated building paper or other approved materials before placing the earth backfill. This will help prevent the gravel from becoming clogged with the earth. An impervious covering should not be used, as this interferes with evaporation. The top of a new absorption trench must be adequately overfilled to allow for settling, and tamped to prevent erosion.

~~It has been found that root problems may be prevented by using a liberal amount of gravel or stone around the pipe. Clogging due to roots has occurred mostly in lines with insufficient gravel under the pipe. Furthermore, roots seek the location where moisture conditions are most favorable for growth. In general, trenches constructed near large trees or dense shrubbery should have at least 12 inches of gravel or crushed stone beneath the pipe.~~

~~The top of a new absorption trench must be adequately overfilled to allow for settling, and tamped to prevent erosion.~~

9.10.3. ~~A heavy vehicle may crush the pipe in a shallow absorption field. For this reason h~~ Heavy machinery, exclusive of the equipment needed to install the system, shall ~~should~~ be excluded from the ~~disposal~~ absorption area unless special provision is

made to support the weight. All machine grading ~~should be completed before the leaching system is constructed~~, unless specified in the permit, is prohibited.

9.10.4. Where capping fill is incorporated into the design of a system, only track equipment may be utilized when applying the cap.

9.10.5. ~~2.14.~~ Distribution boxes/devices. A distribution box/device is required for every standard absorption ~~field~~ system. The purpose of the box/device is to ensure equal distribution of septic tank effluent to the lateral lines. It is important that the entrance to each lateral line from the distribution box be set at the same elevation to attempt to ensure equal flow into all lines. The design of the distribution box and absorption system can be varied to meet most topographical conditions encountered, while giving proper grade and alignment for all laterals. Distribution boxes shall be sealed, ~~and installed in a manner to prevent shifting.~~ bedded in concrete or gravel on undisturbed ground, and water leveled with leveling devices. All distribution boxes must have an easily removable cover to facilitate leveling, inspection, and repairs. Inlet and outlet lines at the distribution box shall be installed in such a manner as to be firmly supported and adequately sealed as approved by the authorized agent. Where the slope of the site is greater than 0%, the outlet invert (flowline) of the distribution box must be installed at an elevation equal to or greater than the finished ground elevation of the highest line of the absorption area.

~~Typical distribution boxes are shown in FIGURE 7. All distribution boxes must have an easily removable cover to facilitate leveling, inspection, and repairs.~~

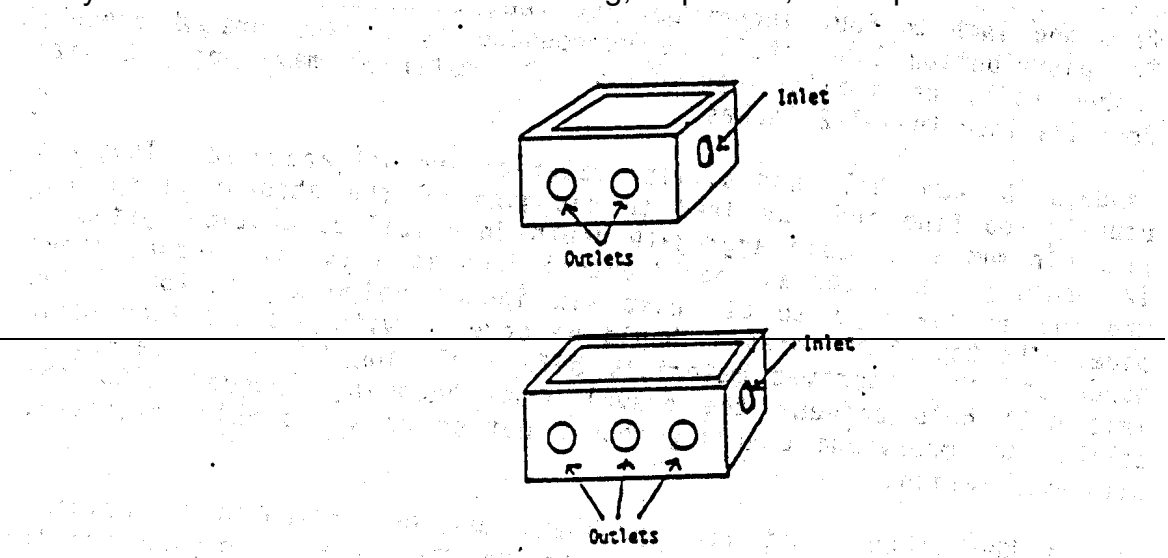


FIGURE 7: TYPICAL DISTRIBUTION BOXES

~~2.15. Inlet and outlet lines at the distribution box. Inlet and outlet lines at the distribution box shall be installed in such a manner as to be firmly supported and adequately sealed as approved by the Local Sanitarian.~~

9.10.6. ~~2.16 Lateral lines. Leaching lateral lines~~ Absorption trenches shall not start closer than 5 feet from the distribution box. ~~and in no case until within the gravel~~ absorption

~~area of the leaching~~ absorption ~~trench~~. A horizontal separation of 5 feet shall be required between the absorption area and tightline trench. In systems utilizing a distribution box, all lateral lines must be of the same length. ~~In systems utilizing serial distribution, lateral lines must be of an appropriate design and adequate length.~~ All distribution devices used in conjunction with soil absorption systems must be approved by the Department prior to their use or installation.

~~2.17. Diversion devices. All diversion devices used in conjunction with serial distribution systems must be approved by the Division of Sanitarian Services, prior to their use or installation~~.

9.10.7. Material used in the construction of the onsite wastewater system shall meet the following requirements (New products may be approved by the Department as technology allows):

SOLID PIPE:

Polyvinyl Chloride (PVC) Plastic Pipe, SDR-35
Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 40
Equivalent approved by the Department of Health

PERFORATED DRAIN PIPES:

Polyvinyl Chloride (PVC) Plastic Pipe (ASTM D2729)
Polyethylene (PE) Plastic Pipe (ASTM F-810)
Equivalent approved by the Department of Health

9.10.8. Any pipe under driveways, roadways, parking areas, or any area where traffic will pass over shall be constructed of Schedule 40 PVC, cast iron, or use a steel sleeve.

9.10.9. House sewer lines shall be installed and maintained in accordance with the Arkansas State Plumbing Code.

9.10.10. Non-metallic Pipe Detection

9.10.10.1. Tracer Wire and/or Detect Tape shall be installed above all non-metallic buried piping in all onsite wastewater systems. Piping includes non-metallic pipe substitutes such as chambers. The purpose of the tracer wire and/or detect tape is future location of buried components of the onsite wastewater system.

9.10.10.2. Tracer wire shall be solid 12-gauge copper wire coated for underground burial with “safety green” colored insulation.

9.10.10.3. Detect Tape shall consist of a minimum thickness of 0.35 millimeters solid aluminum foil encased in a protective impervious jacket of inert material. The overall thickness shall be a minimum of 5.5 millimeters and the width shall be a minimum of 2 inches. The tape shall be color coded “safety green” and imprinted with the message “Caution – Buried Sewer Line Below.”

9.10.10.4. The tracer wire and/or detect tape shall began at or above the septic tank and follow the piping system to and throughout the absorption area. The wire and/or tape shall be looped or wrapped around the effluent access port or access port riser on the septic tank. The tracer wire and/or detect tape shall extend continuously from the septic tank along the tightline to the absorption area and shall be looped or wrapped around any access points. Tracer wire shall be taped directly on top of all transmission pipe at a maximum interval of 12 feet. Detect tape may be fastened directly to the top of the pipe or may be installed in the backfill material above the top of the pipe but at a depth of at least 6 inches below final grade. Tracer wire and/or detect tape shall be installed directly above the pipe/gravel substitute in each trench in trench systems.

9.10.10.5. For drip dispersal systems, the absorption area may be outlined with tracer wire and/or detect tape instead of tracing each individual drip line.

Section 10. Alternate Systems

10.1. Alternate systems outlined in this section shall not be approved as a uniform plan of development in any municipality, community, subdivision, or other developed area.

10.2. All alternate systems outlined in this section shall be installed by a licensed septic system installer. Installers may be required to attend special training sessions before being allowed to install certain types of alternate systems.

10.3. In addition to the permitting requirements outlined in Section 5 of this regulation, a Memorandum of Agreement signed by the property owner shall be submitted as part of the Onsite Wastewater System Application for all alternate systems.

10.4. The Department or its authorized agent may require the designated representative to oversee the construction of projects with unusual or rarely used designs.

10.5. Surface Discharging Systems

10.5.1. Surface discharging systems shall not be approved for sites with soil conditions, which meet the standards referenced in Sections 8.5 and 8.6 for the installation of subsurface absorption systems. Two years after promulgation of these regulations, all sites designed for surface discharging systems shall be reviewed and agreed upon by both a Professional Soil Classifier that holds a current active or inactive Designated Representative license and the authorized agent or the Department to confirm that no subsurface absorption area, as outlined in Sections 8.5 and 8.6 of this regulation, is available for the lot in question.

10.5.2. Surface discharging systems shall not be approved in subdivisions or other high-use areas, regardless of lot size.

10.5.3. All surface discharging systems are subject to National Pollutant Discharge Elimination System (NPDES) Permit requirements.

10.5.4. Disinfection

10.5.4.1. All surface discharging systems must be adequately disinfected prior to discharge.

10.5.4.2. Chlorination, ozone induction, and ultraviolet exposure are all acceptable means of disinfection for surface discharges. Installation, operation and performance data supplied by the manufacturer shall be submitted with all designs incorporating ozone or ultraviolet light devices.

10.5.4.3. Chlorinators used in surface discharging systems shall produce a minimum 10 parts per million chlorine solution during peak flow.

10.5.4.4. A baffled contact chamber sufficient in size to provide a 30 minute retention time with a minimum flow of 1 gallons per minute shall be required after the chlorinator for all surface-discharging systems utilizing chlorine disinfection. The minimum size of a chlorine contact chamber shall be 30 gallons. A sample port must be installed at outlet end of contact chamber.

10.5.4.5. The point of discharge from the chamber shall be above the high water level of a receiving stream or ditch. The chamber discharge elevation shall also be below its influent elevation to prevent filter flooding.

10.5.5. When a surface discharging system fails to function properly or does not consistently meet the discharge requirements, the discharge of wastewater shall stop immediately. The owner shall be allowed to use the septic tank or mechanical treatment unit as a holding facility until adequate repairs are made.

10.5.6. Onsite Discharging Systems

10.5.6.1. Some sites may be adequate in size to retain all effluent discharged to the surface onsite. Sites considered for onsite discharge shall meet the following minimum requirements in addition to setback requirements outlined in Section 6.2 of this regulation.

10.5.6.2. The lot size for all sites proposed for onsite discharge shall be 3 acres or greater.

10.5.6.3. The point of discharge shall be 300 feet or greater from any adjacent dwelling.

10.5.6.4. The point of discharge shall be 100 feet or greater from any adjacent property line.

10.5.6.5. The point of discharge shall be 200 feet or greater from any property line in the direction of flow on sites exhibiting slopes of 12% or less.

10.5.6.6. The point of discharge shall be 100 feet or greater from the dwelling served by the surface discharging system.

10.5.6.1. The slope of the discharge area shall not be greater than 12%. However, variances for sites proposed for surface discharges that exhibit a slope greater than 12% may be requested of the Department in writing. Approval of such variances shall be at the sole discretion of the Department.

10.5.7. Offsite Discharging Systems

10.5.7.1. Offsite discharging systems shall not be approved for new construction.

10.5.7.2. A N.P.D.E.S. Permit shall be obtained from the Arkansas Department of Environmental Quality for all offsite discharging systems.

10.5.8. Underdrains

10.5.8.1. Underdrains may be used in moderate or high hydraulic conductivity soils to reduce brief seasonal water tables on level ground.

10.5.8.2. Where underdrains are incorporated into the design of an onsite wastewater system, the underdrains shall be installed between absorption trenches at a minimum horizontal separation of 5 feet from any absorption trench.

10.5.8.3. Underdrains shall be 6 to 12 inches wide and up to 6 feet deep.

10.5.8.4. Four (4) inch perforated pipe as outlined in Section 9.10.7 of this regulation shall be installed in the bottom of each underdrain.

10.5.8.5. The perforated pipe for each underdrain shall be connected to either a sump or discharge line.

10.5.8.6. Underdrains shall be filled to a minimum vertical depth of 12 inches from the bottom of the underdrain with either gravel or sand aggregate.

10.5.8.7. The aggregate in all underdrains shall be covered with untreated building paper or polyester spun fabric approved by the Department for use in onsite wastewater systems in order to minimize the migration of soil particles into the void spaces of the aggregate.

10.5.8.8. Underdrains shall be backfilled with the original material excavated from the drain trench.

10.5.8.9. The discharge from underdrains shall be considered a surface discharge and shall comply with Section 10.5 of this regulation.

10.6. Drip Dispersal Systems

10.7. Drip dispersal systems offer a means of effluent distribution for sites with limited available area for subsurface absorption and/or high seasonal water tables.

10.7.1. All onsite wastewater systems incorporating drip dispersal shall be designed and installed in accordance with the Department's Guidelines for the Design and Construction of Drip Dispersal Systems.

10.7.2. Drip dispersal systems shall comply with the Onsite Maintenance Program outlined in Section 14 of this regulation.

10.8. Holding Tanks

10.8.1. Holding tanks shall not be approved on sites acceptable for the installation of subsurface onsite wastewater systems as outlined in Sections 8.5 and 8.6 of this regulation.

10.8.2. Holding tanks shall not be approved for residences, full or part time.

10.8.3. The minimum capacity of any holding tank shall be ten times the estimated daily usage as outlined in Appendix C of this regulation or 1000 gallons, whichever is greater.

10.8.4. A service riser with a minimum diameter of 12 inches and installed above ground surface shall be required on all holding tanks. All service risers installed on holding tanks shall be adequately secured to prevent unauthorized access.

10.8.5. Facilities shall be maintained to allow a pumper truck to drive within 10 feet of the service riser in all weather conditions.

10.8.6. Proof of a notarized contract with a licensed septic tank pumper shall be required before a permit to operate is issued. The contract shall provide for pumping within 24 hours of notification, and shall state where the wastewater will be deposited.

10.8.7. Holding tank contents shall not be land applied. The contents of a holding tank shall only be disposed of by means of deposition into a municipal wastewater treatment plant with which the septic tank pumper has permission to dump.

10.8.8. All holding tanks shall comply the specifications for septic tanks outlined in Section 11 of this regulation.

10.8.9. A visible and/or audible high water alarm indicating when the tanks has reached 75% capacity shall be installed inside the structure served by the holding tank. Information on the alarm system's brand name, manufacturer, use, and installation must be provided with the submittal of plans. The name of the licensed pumper and his telephone number must be displayed on the alarm.

10.9. Composting/Incinerating Toilets

A composting toilet is a device specifically designed to retain and process body wastes and, in some cases, household garbage by biological degradation. The process may be either thermophilic or mesophilic, depending on the design of the toilet. Thermophilic devices are normally smaller and require some type of energy input to maintain the desired temperature. Mesophilic devices rely on the heat produced by the biological

process to maintain the required temperature. Whether or not a device can accept household garbage is dependent on product design and intended use. An incinerating toilet is a device designed to reduce body wastes, both urine and feces, to an ash residue. The type of energy used to incinerate wastes is dependent upon the design of the device used.

10.9.1. Only pre-manufactured composting or incinerating toilets approved by the Department shall be utilized in the onsite wastewater system. Under NSF standard 41, all composting and incinerating devices shall be evaluated by an ANSI approved laboratory.

10.9.2. Grey water, exclusive of urine and feces, produced by the structure served by a composting/incinerating toilet shall be renovated or disposed of in accordance with Sections 9 or 10.5 of this regulation.

10.9.3. The stabilized compost from a composting toilet must be buried onsite or deposited in an approved sanitary landfill.

10.9.4. The ash from an incinerating toilet requires no special handling since any pathogen would be destroyed in the incineration process.

~~SECTION III. SEPTIC TANKS.~~

~~3.1. Selection of the septic tank. Assuming that there is sufficient area to accommodate a leaching system, and that construction of the system will be approved by ,local authority, the next step will be selection of a septic tank. Some knowledge of the functions of a septic tank will help in making the proper selection.~~

~~3.2. Functions of septic tanks. Untreated liquid household wastes (sewage) will quickly clog all but the most porous gravel formations. The tank conditions sewage so that it may be more readily percolated into the subsurface formation. Therefore, the most important function of a septic tank is to provide protection for the absorptive ability of the subsoil. Three functions take place within the tank to provide this protection.~~

~~3.3. Removal of solids. Clogging of soil with tank effluent varies directly with the amount of suspended solids in the liquid. As sewage from a building sewer enters a septic tank, its rate of flow is reduced so that larger solids sink to the bottom or rise to the surface. These solids are retained in the tank and the clarified effluent is discharged.~~

~~3.4. Biological treatment. Solids and liquids in the tank are subjected to decomposition by bacterial and natural processes. Bacteria present are of a variety called anaerobic which thrive in the absence of free oxygen. This decomposition or treatment, of sewage under anaerobic conditions is termed septic, hence the name, septic tank. Sewage which has been subjected to such treatment causes less clogging than untreated sewage due to a reduction of suspended solids.~~

~~3.5. Sludge and scum storage. Sludge is an accumulation of solids at the bottom of the tank, while scum is a partially submerged mat of floating solids that may form at the surface of the liquid in the tank. Sludge, and scum to a lesser degree, will be digested and reduced into a smaller volume. However, no matter how efficient the process is, an accumulation~~

of inert solid material will remain in the tank. Space must therefore be provided in the tank to store this material during the interval between cleanings; otherwise, sludge and scum will eventually be scoured from the tank and clog the disposal field.

If properly designed, constructed, maintained and operated, septic tanks are very effective in accomplishing their purpose.

The relative position of a septic tank in a typical subsurface disposal system is illustrated in Figure 3.

The heavier sewage solids settle to the bottom of the tank, forming a blanket of sludge. The lighter solids, including fats and greases, rise to the surface and form a layer of scum. A considerable portion of the sludge and scum are liquefied through decomposition or digestion. During this process. gas is liberated from the sludge carrying a portion of the solids to the surface. where they accumulate with the scum. Ordinarily, they undergo further digestion in the scum layer. and a portion settles again to the sludge blanket. Furthermore. there are relatively wider fluctuations of flow in small tanks than in the large units. This effect has been recognized in TABLE 4. which shows the recommended minimum liquid capacities of septic tanks.

TABLE 4.

MINIMUM CAPACITY OF SEPTIC TANKS

	LIQUID CAPACITY OF TANK (GALLONS)	
NUMBER OF BEDROOMS	RESIDENTIAL	COMMERCIAL
1 & 2	750	Capacity equal to 48 hour flow* Minimum 750
3	1000	
4	1250	

*See Table 2a

Note: For each additional bedroom. add 250 gallons. The minimum septic tank size for systems installed in soils demonstrating a percolation rate over 45 minutes per inch is 1000 gallons.

Capacity is one of the most important considerations in septic tank design. Studies have proven that liberal tank capacity is not only important from a functional standpoint, but is also good economy. The minimum liquid capacities required in TABLE 4., allow for the use of standard household appliances. (Garbage grinders are not recommended for soil absorption systems.)

Location. Septic tanks should be located where they cannot cause contamination of any well, spring or other source of water supply. Underground contamination may travel in any direction and for considerable distance unless filtered effectively. Underground usually moves in the same general direction as the normal movement of the groundwater in the locality. Groundwater usually moves in the direction of the slope or gradient of the water table (i.e.. from the area of high water table to area of lower water table). In

~~general, the water table follows the general contour of the ground surface. For this reason, septic tanks should be located downhill from wells or springs. Sewage from disposal systems occasionally contaminates wells having high surface elevations since the elevations of disposal systems are almost always higher than the level of water in wells located nearby; therefore pollution from a disposal system on a lower surface elevation may still travel downward to the water bearing stratum. It is necessary therefore to rely upon horizontal as well as vertical distances for protection.~~

~~The septic tank or effluent line shall be located 100 feet or more from any source of private water supply.~~

~~The septic tank shall be located 10 feet or more from any building. The tank should not be located in poorly drained areas, nor in any areas subject to flooding. In general, the tank should be located where the largest possible area will be available for the disposal field. Consideration should also be given to the location from the standpoint of cleaning and maintenance. Septic tanks shall be so located that septic tank cleaning equipment trucks can be driven within reasonable vertical and horizontal distance of the tank for the purpose of tank cleaning. Where public sewers may be installed at a future date, provision should be made in the household plumbing system for connection to such sewer.~~

~~The location of all septic tanks shall meet the following minimum horizontal distance requirements as listed in TABLE 3.~~

~~Contrary to popular belief, septic tanks do not accomplish a high degree of bacteria removal. Although the sewage undergoes treatment in passing through the tank, this does not remove all dangerous bacteria, therefore, septic tank effluent cannot be considered safe. The liquid that is discharged from a tank also may cause an odor nuisance unless properly treated. As previously explained, its primary purpose is to condition the sewage so that it will cause less clogging of the disposal field.~~

Section 11. Septic Tanks

11.1. The minimum liquid capacities required in Appendix D, allow for the use of standard household appliances. Garbage grinders are not recommended for subsurface absorption systems.

11.2. Location. Consideration should also be given to the location from the standpoint of cleaning and maintenance. Septic tanks shall be so located that septic tank cleaning equipment trucks can be driven within reasonable vertical and horizontal distance of the tank for the purpose of tank cleaning. Where public sewers may be installed at a future date, provision should be made in the household plumbing system for connection to such sewer.

11.3. All septic tanks, pump basins, and dosing tanks used in Arkansas must be manufactured by an individual holding a current septic tank manufacturer license issued by the Department. The manufacturer is responsible for producing septic tanks, pump basins, and dosing tanks that meet all current requirements as outlined in these regulations.

11.4. The septic tank installer is responsible for inspecting the tank(s) delivered to the jobsite to ensure a licensed manufacturer produced it and that it remains in a sound, watertight condition throughout the installation. All influent and effluent lines connected to the tank must be sealed in a manner that prevents groundwater infiltration and pipe movement. Rubber or plastic pipe penetration seals shall be either cast into the tank or installed after manufacture.

11.5. Specifications for septic tanks, pump basins, and dosing tanks.

11.5.1. ~~A.~~ General. All portions of septic tanks~~, with the exception of accesses over inlet and outlet devices,~~ shall be watertight. Septic tanks shall be constructed of materials not subject to excessive corrosion, ~~or~~ decay, ~~such as concrete, fiberglass polyethylene, or other material as approved by the Department~~, or leakage. Approved materials include concrete, fiberglass, and polyethylene. Approval of other materials will be considered on a case by case basis. All septic tanks sold in the State of Arkansas shall meet the specifications in these regulations and be approved by the Department. With exception of the wall and bottom thickness, pre-cast tanks and cast-in-place tanks shall meet the same design requirements

11.5.2. ~~B.~~ Cast-in-place concrete tanks. Cast-in-place concrete tanks shall be watertight, adequately reinforced and constructed of high strength concrete, and shall be constructed in accordance with good concrete construction practices. The minimum wall and bottom thickness for cast in place septic tanks is 5 inches and the minimum top thickness is 4 inches. Cast in place tanks must be reinforced with #10 welded wire mesh throughout. The bottom and sides must be manufactured in a single, continuous pour. The lids of cast in place tanks must be reinforced with 0.5 inch (#4 rebar) reinforcement rods on 18-inch centers in addition to the welded wire mesh.

~~C. Manholes. (See Fig. 9) Access shall be provided over both the inlet and outlet devices and to each tank compartment by means of either a removable cover or a manhole. Where the top of the tank is located more than 18 inches below the finished grade, manholes and inspection holes should extend to approximately eight inches below the finished grade. The extension can be made using risers of approved material and fitted with tight covers of heavy metal or concrete. Proper attention must be given to the accident hazard involved when manholes are extended close to the ground surface~~.

11.5.3. Pre-cast septic tanks. All pre-cast septic tanks sold and used in Arkansas shall be manufactured in accordance with AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARD SPECIFICATION FOR PRE-CAST CONCRETE SEPTIC TANKS C 1227-94. Pre-cast septic tanks shall be constructed with high strength concrete made with Portland cement and have a compressive strength of 4000 pounds / square inch at 28 days of age. No aggregate used in the concrete mix is to exceed a diameter or length of 0.5 inch. Lightweight aggregates must meet ASTM SPECIFICATION C 330 SPECIFICATION FOR LIGHTWEIGHT AGGREGATES FOR STRUCTURAL CONCRETE. Water used in mixing concrete must be clean and free of injurious amounts of oil, alkalines, acids, salts, or other substances that may be incompatible with concrete. Tanks shall be designed so

they will not collapse or rupture when subjected to anticipated earth and hydrostatic pressures when the tanks are either full or empty.

11.5.3.1. Pre-cast concrete tanks shall be adequately reinforced with #10 welded concrete reinforcement wire tied at the edges and corners. Reinforcement rods are required to be added at lift points. Chairs, bolsters, braces, and spacers in contact with the forms must have a corrosion resistant surface. Reinforcement must be placed as near the center of the walls as possible and shall have a minimum of one-inch concrete cover.

11.5.3.2. The forms used in septic tank manufacture shall be sufficiently rigid and accurate to maintain the dimensions of the tank. All casting surfaces shall be of smooth, non-porous material. Form releasing agents used shall not be injurious to the concrete.

11.5.3.3. Concrete for the tank walls and bottom shall be placed in the forms in a single, continuous pour. The concrete shall be placed in the forms at a rate that allows the concrete to consolidate in all parts of the form and around all reinforcement steel and imbedded fixtures without segregation of materials. The finished tank shall be smooth and have a uniform thickness not less than 2.5 inches. The top of the tank shall be no less than 3.5 inches thick and adequately reinforced to support the load to which it may be subjected. At a minimum, the lid shall be reinforced with #10 welded wire mesh and 0.5 inch (#4 rebar) reinforcement rods on 18-inch centers. Pre-cast concrete tanks shall be cured for 28 days before delivery to assure proper curing. During delivery, the tanks are to be properly handled to assure the installation of a tank that is watertight and otherwise in good condition.

11.5.3.4. All joints between the tank and lid and between 2 sections of 2 piece tanks shall be sealed to prevent leakage during settling or shifting. The sealant shall be resistant to corrosion and anaerobic activity. The inside joint seam gap, between the 2 sections placed together before sealing, is not to exceed 1/4 (0.25) inch.

11.5.3.5. Septic tank manufacturers are required to demonstrate the water tightness on their products when requested by the system designer, installer or the authorized agent. Testing for leakage may be done using either vacuum testing or water pressure testing.

11.5.3.5.1. Vacuum testing. Seal the empty tank and apply a vacuum to 2 inches (50mm) of mercury. The tank is approved if the vacuum is held for 60 minutes.

11.5.3.5.2. Water-pressure testing. Seal the tank, fill with water to the level of the top of the access port, let stand for 24 hours. Refill tank. The tank shall be considered water tight if the water level is held for 60 minutes.

11.5.3.6. All precast concrete septic tanks manufactured and used in Arkansas must be clearly, permanently, and legibly labeled with the following:

11.5.3.6.1. The name of the individual or company that manufactured the tank.

11.5.3.6.2. The liquid capacity of the tank in gallons.

11.5.3.6.3. The inlet and outlet(s) must be indicated.

11.5.3.6.4. The date of manufacture.

11.5.4. ~~E.~~ Tank proportions. ~~(See Fig. 8)~~ The liquid depth of any tank compartment shall not be less than ~~three feet~~ 36 inches and shall not exceed ~~six feet~~ 72 inches. The minimum horizontal distance from the inlet to the outlet of any tank may not be less than ~~36~~ 72 inches. Storage capacity is required above the liquid line to provide for that portion of scum that floats above the liquid in all septic tanks. On the average, 30% of the total scum will accumulate above the liquid line. In addition to the provision for scum storage, one inch shall be provided at the top of the tank to permit the free passage of gas back to the inlet and house vent pipe. For tanks having vertical sides, the distance between the inside top of the tank and the liquid level ~~should be seven inches or greater~~ shall be 12.5% of the liquid capacity or 9 inches, which ever is greater. In horizontal, cylindrical tanks, this distance should be equal to 20% of the tank diameter.

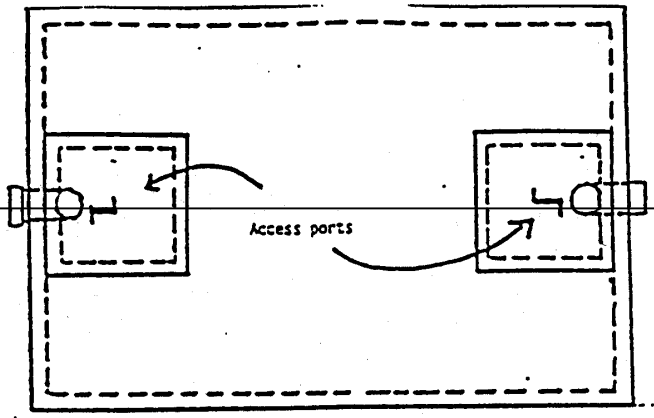
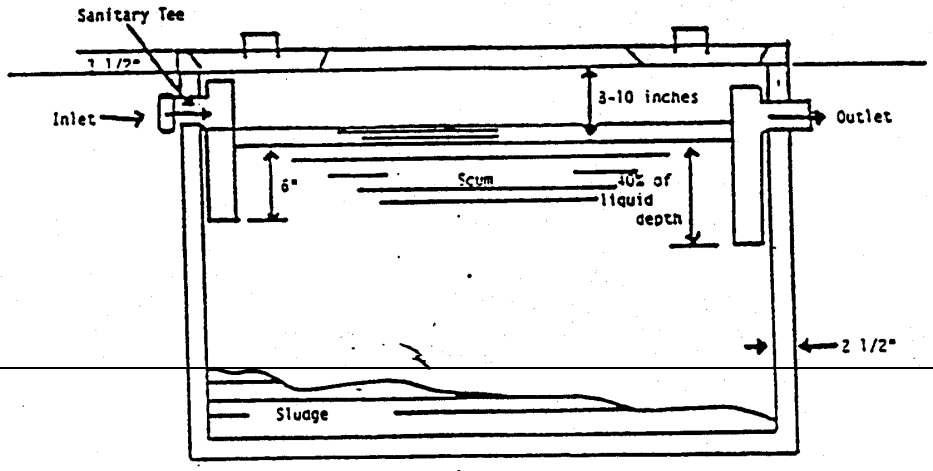


FIGURE 8: TYPICAL PRE-CAST CONCRETE SEPTIC TANK (TOP AND SIDE VIEWS)



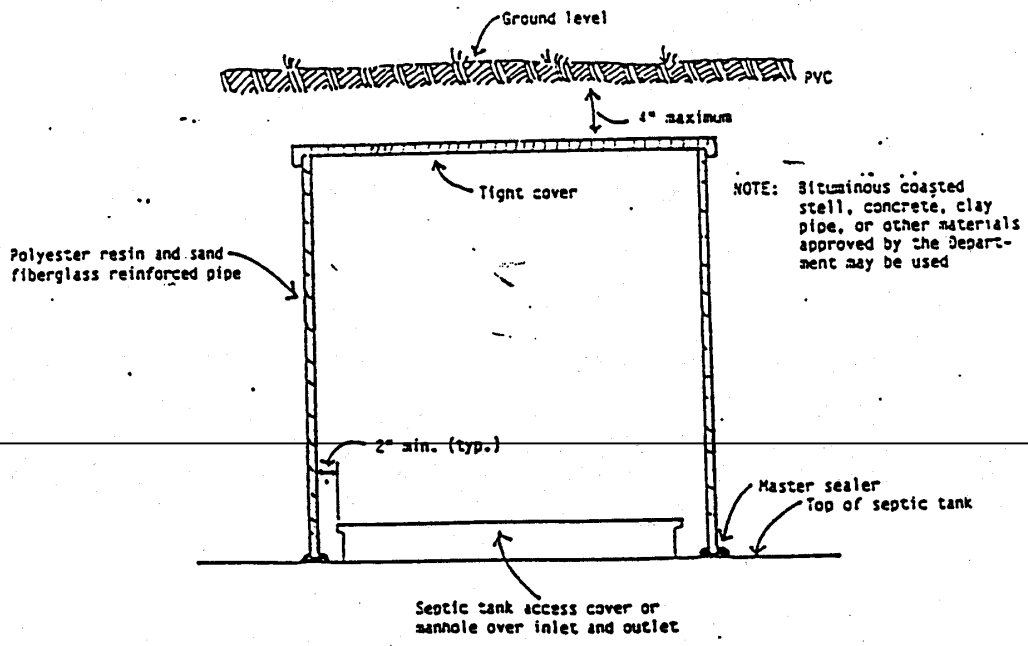


FIGURE 9: TYPICAL MANHOLE CONSTRUCTION FOR FIBERGLASS OR CONCRETE SEPTIC TANKS

~~The minimum capacity of any compartment of a multi-compartment tank shall not be less than 250 gallons, and the inlet end compartment capacity shall not be less than~~

~~350 gallons. Rectangular tank lengths shall be from two to three times the width. For cast-in-place septic tanks the minimum thickness of the walls and bottom shall be four inches, and the top 3.5 inches~~

~~Storage capacity is required above the liquid line to provide for that portion of scum, which floats above the liquid in all septic tanks. On the average, 30 percent of the total scum will accumulate above the liquid line. In addition to the provision for scum storage, one inch should be provided at the top of the tank to permit the free passage of gas back to the inlet and house vent pipe. For tanks having vertical sides, the distance between the top of the tank and the liquid level should be seven inches or greater. In horizontal, cylindrical tanks, the distance should be equal to 20 percent of the tank diameter.~~

11.5.5. ~~E.~~ Inlet and outlet. Four-inch or larger schedule 40 sanitary tees shall be used as inlet and outlet devices in all septic tanks. ~~Baffles may be used in addition to tees but shall not be considered as an acceptable alternative to tees.~~ The septic tank manufacturer shall provide properly constructed inlet and outlet devices with each tank. The inlet invert shall enter the tank at least 3 inches above the liquid level in the tank to allow for a momentary rise in liquid level during discharges to the tank. This free drop prevents backwater and standing of solid material in the house sewer leading to the tank. The inlet tee shall extend 6 inches below the liquid level in the tank and extend above the liquid level to a minimum of one inch from the top of the tank. ~~Inlet and outlet tees shall be four inch or larger Schedule 40 PVC or other non-corrosive material approved by the Department.~~

~~It is important that the outlet tee penetrate just far enough below the liquid level of the septic tank to provide a balance between sludge and scum accumulation; otherwise, part of the advantage of capacity is lost. A lateral section of a properly operating tank would show it divided into three distinct layers: scum at the top, a middle one free of solids (called clear space) and a bottom layer of sludge. The outlet tee retains scum in the tank but, at the same time, it limits the amount of sludge that can be accumulated without scouring, which results in sludge discharging in the effluent from the tank~~.

11.5.5.1. The outlet tee shall extend to a distance below the surface to 40% of the liquid depth. ~~For horizontal, cylindrical tanks, this should be reduced to 35 percent. For example, in a horizontal, cylindrical tank having a liquid depth of 42 inches, the outlet tee should penetrate 42 x 0.35 = 14.7 inches below the liquid level.~~ When equipped with an approved effluent filter outlet tees shall extend to a distance below the surface 35 to 45%of the liquid depth.

11.5.6. Proprietary gas deflectors, outlet filters, and other devices designed to deflect or otherwise prevent solids from entering the outlet tee are not required but are recommended to increase the efficiency of the septic tank. Where gas deflectors, outlet filters, or other devices requiring routine maintenance are installed in the tank, a service riser extending to grade shall be installed over the outlet inspection port. All outlet baffles and devices must be evaluated and approved by the Department prior to use. Manufacturers may submit product samples and ancillary documentation to the Department for evaluation. After evaluation, the Department

will either approve or not approve the product submitted. Lists of approved products will be routinely updated and distributed.

~~F. Pre-cast septic tanks. Pre-cast septic tanks may be constructed with high strength concrete or other materials as approved by the Department.~~

~~With exception of the wall and bottom thickness, pre-cast tanks shall meet the same design requirements as specified for cast-in-p1ace septic tanks.~~

~~Pre-cast concrete tanks shall be constructed with high strength concrete, adequately reinforced with #10 welded concrete reinforcement wire or equal, and free from honeycombs. Reinforcement shall be placed as near the center of the walls as possible and shall have a minimum of one inch concrete cover. The tank walls and bottom shall be smooth and have a uniform thickness of not less than 2-1/2 inches. The top of the tanks shall not be less than 3-1/2 inches thick, and adequately reinforced to support the load to which it may be subjected. Pre-cast concrete tanks shall be cured properly and handled to assure installation of a tank that is watertight and otherwise in good condition. The liquid capacity, in gallons, shall be clearly shown on all tanks.~~

11.5.7. ~~F.~~ Fiberglass septic tanks**.** Fiberglass septic tanks shall comply with International Association of Plumbing and Mechanical Officials ~~Specifications 9APMO 3-74)~~ or American Society For Testing And Materials specifications. The manufacturer shall supply without charge satisfactory evidence of approval and compliance with ~~IAPMO IGC 3-74~~ current IAPMO or ASTM construction and manufacturing requirements.

~~Manhole risers shall be furnished by the tank manufacturer. Risers may be installed on the tank by the manufacturer, or set and fiberglassed in place by the installer. Fiberglas sing shall in either case comply with the manufacturers' recommendations.~~

11.5.8. Service Risers. Access shall be provided over both the inlet and outlet tees or devices and to each tank compartment by means of a service risers. All maintenance ports must be sealed and watertight. Where the top of the tank is located more than 8 inches below the finished grade, service risers should extend to the finished grade. The extension can be made using risers of approved material and fitted with tight covers of heavy metal or concrete and secured to prevent unauthorized access. Proper attention must be given to the accident hazard involved when maintenance ports are extended close to the ground surface.

11.5.8.1. Service risers, when used, should be available through the septic tank manufacturer. Risers may be installed on the tank by the manufacturer or set in place and sealed in a sanitary manner by the installer.

11.6. Grease interceptors shall be installed and maintained in accordance with the ARKANSAS STATE PLUMBING CODE. The minimum volume in gallons for a grease interceptor shall either be 500 or the number of fixture units multiplied times a flow rate of 7.5 gallons per minute multiplied times a 12 minute retention time (#FUx7.5x12), whichever is greater. Fixture units will be calculated using Arkansas State Plumbing Code. Grease interceptors installed below finished grade will be installed with service risers to the finished grade.

The size of the service riser will be adequate in size to accommodate proper inspection and maintenance.

~~3.8. Approved pipe material. Material used in the construction of the sewage disposal system shall meet the following requirements:~~

~~HOUSE SEWER AND OTHER SOLID PIPE~~

~~Polyvinyl Chloride (PVC) Plastic Pipe, SDR-35~~
~~Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 40~~
~~Equivalent approved by the Department of Health~~

~~PERFORATED DRAIN PIPES:~~

~~Polyvinyl Chloride (PVC) Plastic Pipe (ASTM 02729)~~
~~Polyvinyl Chloride (PVC) Plastic Pipe (ASTM F-810)~~

~~Equivalent approved by the Department of Health~~

~~Any pipe under driveways, roadways, parking areas, any area where traffic will pass over, or instances where less than six (6) inches of cover is used, shall be constructed of Schedule 40 PVC, cast iron, or use a steel sleeve.~~

~~SECTION IV. DOSING TANKS. Dosing tanks with one or more dosing siphons or pumps are required for leaching systems having 500 or more lineal feet of pipe. This will permit proper distribution of the septic tank effluent throughout the disposal area and give the absorption area a rest or recovery period between dosings. Dosing tanks for all leaching systems are a good management practice and reduction in leaching field size as described in SECTION II.6.A. is permitted.~~

~~4.1 Dosing tanks.. The dosing. tanks must. have a capacity sufficient to contain the required dose. The dose must be applied to the absorption field at a rate of 0.25 to 0.5 gallons per square feet per dose.~~

~~4.2 Siphon or pump capacity. The capacity of a dosing siphon should be determined from the recommendations of the manufacturer of this equipment. If a pump is used it should have a capacity sufficient to empty the dosing tank in a period not to exceed 10 minutes. The pump controls must operate automatically and be sufficiently adjustable to deliver the required dose volume. High water alarms in dosing chambers are recommended but not required.~~

~~4.3. Pump for dosing applications. A sewage effluent pump may be substituted for a dosing siphon when gravity flow is not possible from the dosing tank or at the discretion of the Designated Representative. Only effluent quality pumps should be utilized in dosing application. Dewatering and grinder pumps will not be approved.~~

~~4.4. Distribution boxes. All distribution boxes utilized on dosed systems must be baffled in order to insure flow equalization.~~

4.5. ~~Illustrations. Typical pump tanks, dosing tanks and details are illustrated in FIGURE 10 and FIGURE 11.~~

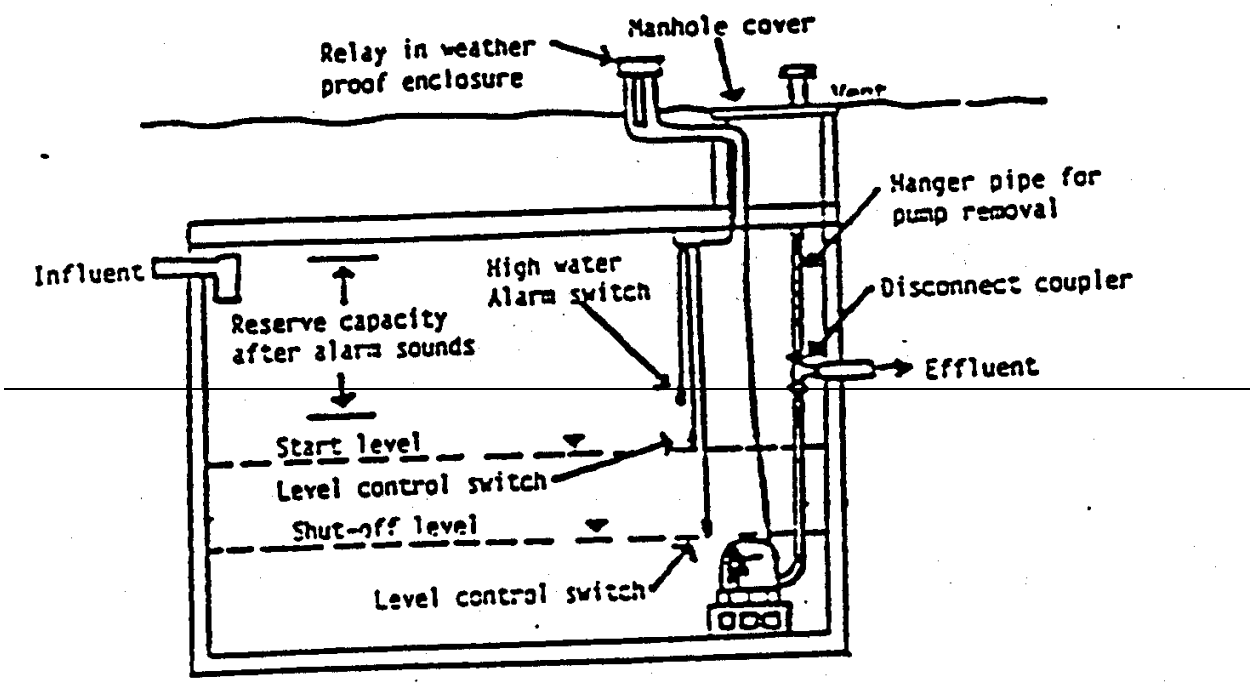


FIGURE 10: TYPICAL DOSE TANK WITH EFFLUENT PUMP

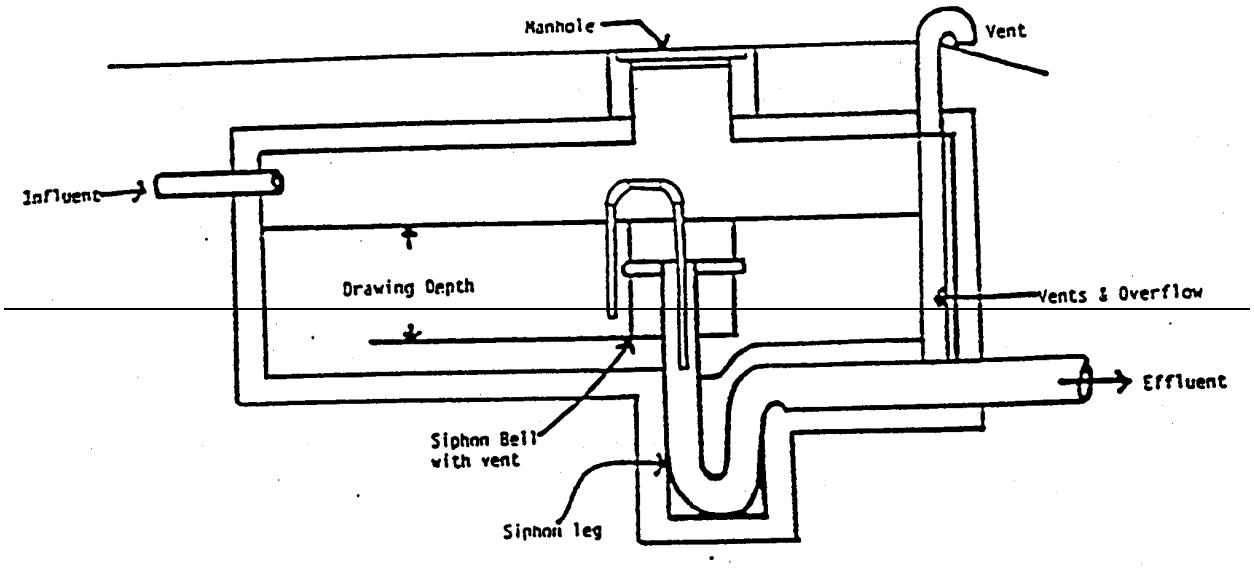


FIGURE 11: TYPICAL DOSE SIPHON AND TANK

SECTION V. GREASE INTERCEPTORS.

5.1. Residential. Grease interceptors (grease traps) are not necessary or recommended for a residence. Drainage from kitchen sinks should be discharged through the plumbing system to the septic tank.

5.2. Commercial buildings. Grease interceptors are necessary on kitchen drain lines from institutions, hotels, restaurants, schools with lunchroom and other establishments from which a relatively high volume of grease may be discharged. Grease interceptor waste shall also be treated in the septic tank before being discharged into the disposal field. Consideration is to be given to the current edition of the Arkansas State Plumbing Code in this regard.

5.3. Garbage grinder waste. Waste from garbage grinder should not pass through any interceptor or grease trap before being discharged to a septic tank.

5.4. Specifications of grease trap materials. Grease interceptors, when used, shall be so designed and installed that they will not become air bound. A cover shall be provided and located so as to be conveniently accessible for servicing and cleaning the interceptor. Grease interceptors shall be an approved manufactured type with proper efficiency rating and flow capacity.

5.5. Specifications of construction of grease traps. Grease traps installed on the outside of buildings shall be of watertight construction, be inaccessible to insects and vermin, and shall be of metal, pre-cast concrete. constructed on the job of concrete or combined glazed tile and concrete. Metal grease traps shall be coated inside and out with a heavy bituminized asphalt or coal tar coating.

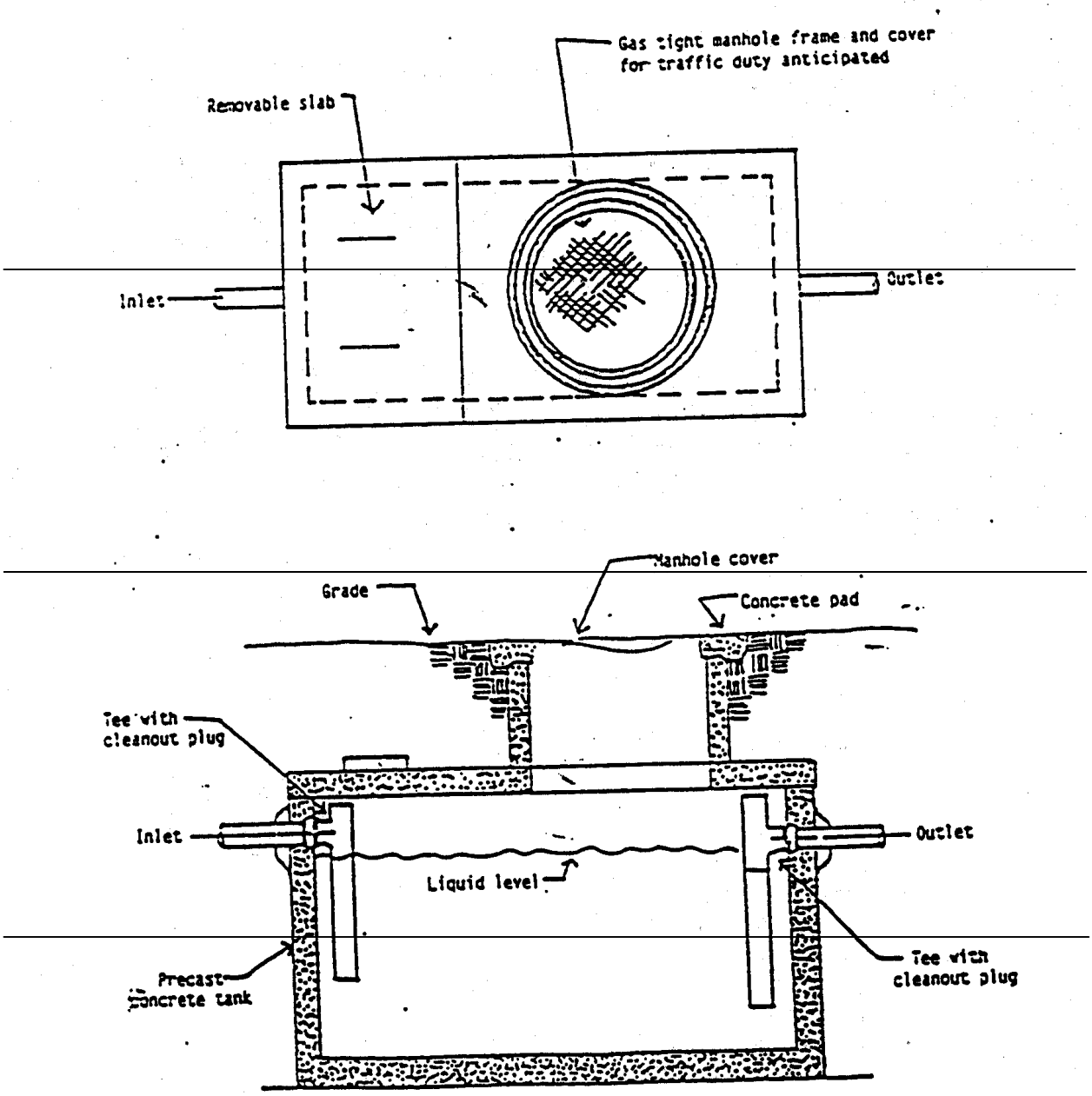
TABLE 5.

RATINGS FOR COMMERCIAL GREASE TRAPS

TYPE OF FIIXTURE	RATE OF FLOW IN G.P.M. IN POUNDS
Restaurant kitchen sink	15
Single-compartment scullery sink	20
Double-compartment scullery sink	25
2 single compartment sinks	25
2 double compartment sinks	35
Dishwashers for restaurants	
Up to 30 gal. water capacity	15
30 to 50 gal. water capacity	25
50 to 100 gal. water capacity	40

Grease traps shall be constructed so as to ensure that both the inlet and outlet are submerged to properly trap the grease, and that the distance between inlet and outlet would be sufficient to allow separation of the grease, so that grease solids will not escape through the outlet.

~~The principles of the grease trap are illustrated in Figure 12.~~



~~5.6. Sizing the grease trap. Proper sizing of the grease trap should be based on efficiency ratings and flow capacities which are determined by the number and kinds of sinks of fixtures discharging into the trap.~~

~~Using the chart in TABLE 5, add the flow rates for all grease producing fixtures. Multiply this number by the required four (4) minute retention time. The result is the minimum grease trap size in gallons.~~

The minimum capacity of a grease trap, when installed in conjunction with a septic tank, shall not be less than 125 gallons. It is generally good economy to build grease traps somewhat oversized to reduce servicing costs.

5.7. Operation and maintenance of a grease trap. Grease traps, to be effective, must be operated properly and cleaned regularly to prevent the escape of grease solids into the septic tank.

Generally, the trap should be cleaned when 25 percent of the grease retention capacity is filled with accumulated grease. Experience will determine the frequency of cleaning.

Grease traps must be tightly covered to prevent odor and to exclude insects and vermin. Grease removed from a trap should be disposed of by procedures approved by the Department. It is essential to be thorough in cleaning the trap, the edges of the top, and around the trap, to allow a tight seal and not attract mice, rats and insects.

SECTION VI. THE HOUSE SEWER:

6.1. House sewer. The house sewer is an important part of the private sewage disposal system. It should convey the sewage from the building to the septic tank inlet, but not at a high velocity that would cause disturbance in the septic tank. The house sewer shall not be reduced in size from the house drain to the septic tank. Care shall be taken to obtain a tight seal at the entrance of the house sewer into the septic tank. The house sewer is a part of the plumbing system as well as the disposal system and is under the Regulations of the Arkansas State Plumbing Code.

6.2 House sewer materials. The building sewer shall be of cast iron, schedule 40 PVC, SDR 35 or other material approved by the Department. The SECTION 3.8 will apply also to the effluent line or outlet sewer between the septic tank and distribution box.

6.3. House sewer grade. The grade or slope of the house sewer, which conveys the sewage to the septic tank, should be sufficient to move the sewage slowly but efficiently to the septic tank. Excessive grades will cause increased velocity into the tank and have a tendency to disrupt the settling action of the tank. Too little grade will result in sewer stoppage and a nuisance. The house sewer should be installed with a uniform slope, with not less than 1/8 inch fall per foot, and preferably not more than 1/4 inch per foot.

6.4. Joints and connections. Joints and connections of the house sewer shall be watertight and root proof. Such joints or connections shall be made as outlined in the Arkansas State Plumbing Code. Joints and connections shall not be permitted in that portion of the house sewer which crosses the excavated hole dug for the septic tank.

6.5. Adaptor for different size pipes. Where different sizes of pipe, or pipes and fittings are to be connected, the proper size adaptors shall be used between the two sizes.

6.6. Cleanouts. Cleanouts shall not be more than 50 feet apart in horizontal house sewer lines of less than 4 inches nominal diameter, and not more than 100 feet apart in horizontal house sewer lines of 4 inch nominal diameter or larger. A cleanout shall be installed to all changes in direction greater than 45 degrees.

Section 12. Secondary Treatment

Secondary treatment systems utilize an additional means of septic effluent treatment subsequent to the primary treatment performed by a septic tank. Some aerobic treatment units (ATUs) do not require that effluent be treated by a septic tank prior to treatment by the ATU. All secondary treatment units incorporated into the design of an onsite wastewater system shall comply with the following specifications.

12.1. Effluent treated by a secondary treatment unit shall be further renovated or discharged in accordance with either Section 9 or Section 10.5 of this regulation.

12.2. The discharge from all secondary treatment units shall meet current N.P.D.E.S. discharge requirements.

12.3. All onsite wastewater systems incorporating secondary treatment units shall comply with the Onsite Maintenance Program outlined in Section 14 of this regulation.

12.4. Aerobic Treatment Units (ATUs)

12.4.1. Only ATUs approved by the Department shall be utilized in onsite wastewater systems.

12.4.2. ATUs shall be installed according the manufacturer's specifications as approved by the Department. Some ATUs require certification by the manufacturer in order to install and/or maintain the unit.

12.5. Single Pass Filters

12.5.1. Intermittent Sand Filters (ISFs)

12.5.1.1. Intermittent Sand Filters pass effluent treated by a septic tank or ATU through a sand and gravel bed, built on site, prior to subsurface absorption or surface discharge. Intermittent sand filters shall meet the following criteria.

12.5.1.2. A septic tank or ATU shall be required as the primary treatment of effluent prior to treatment by an ISF.

12.5.1.3. Effluent shall be dosed to the ISF by a pump housed in a pump vault approved by the Department.

12.5.1.4. Effluent shall be distributed to the ISF by means of low pressure distribution as outlined in Section 9.9 of this regulation.

12.5.1.5. The collection line in the bottom of an ISF shall not be less than 4 inch perforated or slotted schedule 40 PVC pipe.

12.5.1.6. The dosing rate for ISFs shall not be greater than 0.25 gallons per orifice per dose (gal/orifice/dose).

12.5.1.7. The loading rate for ISFs shall not be greater than 1.25 gallons per square foot per day (gal/ft^2/day).

12.5.1.8. ISFs may be installed either in or above ground. However, the top of the ISF shall not be installed below the finished grade of the ground surface.

12.5.1.9. A PVC liner not less than 30 millimeters in thickness, with inlet and outlet boots shall be required in all ISFs in order to minimize groundwater infiltration into the system.

12.5.1.10. Not less than 2 inches of gravel cover shall be applied atop the collection pipe in the bottom of an ISF. The gravel used shall be crushed rock or rounded rock, 1.0 inches to 2.5 inches in diameter.

12.5.1.11. Not less than 4 inches of 3/8 inch peagravel shall be applied atop the crushed or rounded rock in the bottom of an ISF in order to prevent migration of filter sand into the collection piping and out of the filter.

12.5.1.12. Not less than 24 inches of filter sand shall be applied atop the peagravel in the bottom of the ISF. Filter media used shall be 0.28 millimeters to 1.0 millimeters in diameter, with a uniformity coefficient of 4.0.

12.5.1.13. Not less than 3 inches of 3/8 inch peagravel shall be applied atop the filter sand in an ISF. The low pressure distribution system servicing an ISF shall be installed atop this layer of peagravel.

12.5.1.14. Not less than 3 inches of 3/8 inch peagravel shall be installed as cover over the low pressure distribution system servicing an ISF.

12.5.1.15. No greater than 6 inches of soil cover shall be applied to the surface of the gravel and sand bed in order to minimize odor produced by an ISF. Polyester spun fabric shall be installed atop the filter bed prior to the application of the soil cover in order to prevent the migration of the soil cover into the filter bed.

12.6. Multiple Pass Filters

12.6.1. Recirculating Sand Filters (RSFs)

12.6.1.1. Recirculating Sand Filters pass effluent treated by a septic tank or ATU through a sand and gravel bed, built on site, prior to subsurface absorption or surface discharge. Recirculating sand filters shall meet the following criteria:

12.6.1.2. A septic tank or ATU shall be required as the primary treatment of effluent prior to treatment by an RSF.

12.6.1.3. Effluent shall be dosed to an RSF by a pump housed in a pump vault approved by the Department.

12.6.1.4. Effluent shall be distributed to an RSF by means of low pressure distribution as outlined in Section 9.9 of this regulation.

12.6.1.5. The collection line in the bottom of an RSF shall not be less than 4 inch perforated or slotted schedule 40 PVC pipe.

12.6.1.6. The dosing rate for RSFs shall not be greater than 0.25 gallons per orifice per dose (gal/orifice/dose).

12.6.1.7. The initial recirculation rate for RSFs shall be 5:1. Depending upon water usage, the recirculation rate may be adjusted after system evaluation.

12.6.1.8. The loading rate for RSFs shall not be greater than 5 gallons per square foot per day (gal/ft^2/day).

12.6.1.9. RSFs may be installed either in or above ground. However, the top of the RSF shall not be installed below the finished grade of the ground surface.

12.6.1.10. A PVC liner not less than 30 millimeters in thickness, with inlet and outlet boots shall be required in all RSFs in order to minimize groundwater infiltration into the system.

12.6.1.11. Not less than 2 inches of gravel cover shall be applied atop the collection pipe in the bottom of an RSF. The gravel used shall be crushed rock or rounded rock, 0.5 inch to 1.5 inches in diameter.

12.6.1.12. Not less than 4 inches of 3/8 inch pea gravel shall be applied atop the crushed or rounded rock in the bottom of an RSF in order to prevent migration of filter sand into the collection piping and out of the filter.

12.6.1.13. Not less than 24 inches of filter sand shall be applied atop the peagravel in the bottom of an RSF. Filter media used shall be 1.5 millimeters to 2.5 millimeters in diameter, with a uniformity coefficient of 2.0 or less.

12.6.1.14. Not less than 3 inches of 3/8 inch pea gravel shall be applied atop the filter sand in a RSF. The low pressure distribution system servicing an RSF shall be installed atop this layer of pea gravel.

12.6.1.15. Not less than 3 inches of 3/8 inch pea gravel shall be installed as cover over the low pressure distribution system servicing an RSF.

12.6.1.16. The top of the RSF filter bed shall be left uncovered.

12.7. Other Filters

Proprietary media filters such as peat filters, gravel filters, and geo-textile filters shall be designed and installed in accordance with the manufacturer's specifications as approved by the Department.

Section 13. Disposal of Wastes

The contents of all facilities used for the collection, treatment and disposal of wastewater in onsite wastewater systems shall be disposed of by burial or burning in a suitable location and manner, or other methods approved by the Arkansas Department of Health.

Section 14. Onsite Maintenance and Monitoring Program

Owners of Surface Discharging Systems, which include alternate systems discharging into reduced absorption areas, Drip Dispersal Systems, or Holding Tanks, are required to maintain a Maintenance and Monitoring Contract with Maintenance Personnel certified by the Department for the life of the system.

14.1. The Maintenance and Monitoring Contract and the Memorandum of Agreement shall be submitted with the Application for an Onsite Wastewater System Permit (EHP-19).

14.2. All Maintenance and Monitoring Contracts shall include the following minimum terms or services:

Frequency of system assessments

Assessment of system components

Assessment of discharge route for surface discharge systems

Measurement of free chlorine residual

Reporting to the Arkansas Department of Health

14.3. Assessments shall be conducted for all systems maintained and monitored under the program a minimum of once every 6 months.

14.4. Free chlorine residual will be measured and recorded from the outlet end of the contact chamber. If the free chlorine residual is less than 0.1 parts per million, collection of a fecal coliform sample is required within acceptable limits, as specified the National Pollutant Discharge Elimination System (NPDES) discharge parameters, before returning to a routine schedule.

14.5. Where ozone, ultraviolet, or other disinfection methods that do not produce a chlorine residual are incorporated in the system, annual fecal analysis of the discharged effluent shall be required.

~~SECTION VII. PERMITS AND INSPECTIONS.~~

~~7.1. Permit requirement. It shall be unlawful for any person, firm, corporation, association, municipality or governmental agency to begin construction, alteration, repair or extension of any individual sewage disposal system, owned by any other person, firm, corporation,~~

association, municipality or governmental agency until the owner first obtains a valid PERMIT FOR CONSTRUCTION issued by the Department or its authorized agent.

It shall be unlawful for any person, firm, corporation, association, municipality or governmental agency to begin operation of any septic tank system until such system has been inspected and approved by the Department or its authorized agent and the owner has first obtained a PERMIT FOR OPERATION issued by the Department or its authorized agent.

It shall be unlawful for any installer to begin construction, alteration, repair or extension of any individual sewage disposal system owned by any other person, firm, corporation, association, municipality or governmental agency to begin construction, alteration, repair or extension of any individual sewage disposal system, owned by any other person, firm, corporation, association, municipality or governmental agency until the installer first notifies the County Sanitarian of the date he plans to begin work on said system. Emergency repairs may be undertaken without prior notification to the Sanitarian provided notification is made as soon thereafter as reasonable.

To those cities or counties with Sanitarians, the Sanitarian shall be the authorized agent of the Department. In the event that an authorized agent has not been designated for a city or county, applications for septic tank systems shall be made to the Department. Application forms and instructions may be obtained from the Local Sanitarian or from the Department.

7.2. Plan review fee. A fee of thirty dollars ($30.00) shall be levied for the review of each permit. Permit fees shall be made payable to the Arkansas Department of Health. The review fee of thirty dollars ($30.00) must be paid before the issuance of PART 1 of the PERMIT. There shall be no refund of the fee or any part thereof due to failure to proceed under the PERMIT. Construction must begin within one year of issuance or the permit must be re-validated by the Department or its authorized agent.

7.3 Permit procedure.

A. Part I of the PERMIT is the PERMIT FOR CONSTRUCTION. Part I of the APPLICATION form must be completed and approved prior to initiating construction. The information to be reported in this portion includes the results of the percolation test, soil determination results, lot dimensions, system design, system layout and other information required by the authorized agent of the Department.

This section must be completed by a Designated Representative of the authorized agent in accordance with current guidelines and approved prior to initiating construction.

No changes or alterations may be made to the system prior to or during construction without prior approval of the authorized agent.

B. An installation inspection shall be made during the construction of every septic tank system. The inspection may be made during any phase of the installation.

It shall be the duty of the holder of the PERMIT FOR CONSTRUCTION to notify the Division of Environmental Health Protection of the Department of Health, its authorized agent or Designated Representative, 24 hours prior to when the installation is to begin and it shall be the duty of the owner or occupant of the property to give the Division of Sanitarian Services of the Department of Health, its authorized agent or Designated Representative, free access to the property at reasonable times for the purpose of making the installation inspection. The installation shall not be covered until the approval of the authorized agent has been affixed to the inspection report in the space provided on the form.

C. PART III of the PERMIT is the PERMIT FOR OPERATION. After approval of the inspection, the authorized agent will approve and issue a PERMIT FOR OPERATION (PART II and PART III of the PERMIT). The system shall not be used until the PERMIT FOR OPERATION is issued. The authorized agent will retain the original and return the remaining copies to the owner.

7.4. Refusal of permit. Except as provided in SECTION 11.3, a PERMIT for the construction, alteration, repair, extension or operation of a septic tank system or alternate/experimental system shall be refused where public sewer systems are reasonably available or economically feasible, or in instances where the issuance of such PERMIT is in conflict with the other applicable laws and regulations or where the issuance of such permit is in conflict with the public policy declared in Act 402 of 1977 as amended, except that emergency repairs may be undertaken without prior issuance of a PERMIT, provided a PERMIT is subsequently obtained within ten (10) working days after the repairs are made.

Section 15. Designated Representatives

15.1. 7.5 Designated Representatives. A fee of fifty dollars ($50.00) shall be levied annually for the registration of each Designated Representative. Each Designated Representative who operates within the State of Arkansas, regardless of wherever the where their home office may be, must be registered by the Department. The registration will be issued by the Department or its authorized agent upon successful completion of an examination and compliance with the provisions of the Rules and Regulations. In order to maintain registration, a Designative Representative must attend at least one (1) annual training course provided approved by the Department in order to maintain registration prior to March 1 and continue to demonstrate competency in practice to ensure the purpose of this regulation. The registration Registration renewal fees shall be renewable on January 1 of each year and. fFailure to renew pay the registration renewal fee by March 1 shall require re-examination in order to become registered. result in a late fee equal to one half of the renewal fee. Failure to pay the registration renewal fee within a calendar year or failure to attend an approved training course by March 1 shall require re-examination in order to become registered.

15.2. The Designated Representative's license may be revoked or suspended by an authorized agent of the Department, without advance notice whenever any provision of these Rules and Regulations is violated pursuant unto the Arkansas Administrative Procedures Act. The Designated Representative may appeal such revocation as provided for in the ARKANSAS ADMINISTRATIVE PROCEDURE ACT.

15.3. Each Designated Representative must furnish proof of current registration upon request by an authorized agent of the Department.

Section 16. Installers

16.1. ~~7.6. Installers.~~ Each installer who operates within the State of Arkansas, regardless of wherever the home office may be, must be registered by the Department. The registration will be issued by the Department or its authorized agent upon successful completion of an examination and compliance with the provisions of the Rules and Regulations. In order to maintain registration, an installer must continue to demonstrate competency in practice to ensure the purpose of this regulation. The registration shall ~~require re-examination in order to become registered.~~ be renewable on January 1 of each year. Failure to renew by March 1 shall result in a late fee equal to one half of the renewal fee. Failure to renew within a calendar year shall require re-examination in order to become registered. Installers licensed at the time of the effective date of this regulation will be exempt from the initial examination.

16.2. The installer's ~~registration~~ license may be revoked or suspended ~~by an authorized agent of the Department, without advance notice,~~ whenever any provision of these Rules and Regulations is violated pursuant unto the Arkansas Administrative Procedures Act. ~~The installer may appeal such revocation as provided for in the ARKANSAS ADMINISTRATIVE PROCEDURE ACT.~~

16.3. Each installer must furnish proof of current registration upon request by an authorized agent of the Department.

16.4. It shall be a violation of these Rules and Regulations for an installer to start the actual construction, alteration, repair or extension of any ~~individual sewage disposal~~ onsite wastewater system without first notifying the Department or its authorized agent ~~the day he plans to begin work on said system~~ 24 hours in advance.

16.5. ~~7.7.~~ Installer's registration fee. A fee of fifty dollars ($50.00) shall be levied annually for the registration of each installer. The registration fee shall be made payable to the Arkansas Department of Health and shall be attached to the completed APPLICATION and forwarded to the Arkansas Department of Health.

Section 17. Manufacturers

~~7.8 Manufacturers registration.~~ All septic tank manufacturers doing business in Arkansas must hold a valid registration issued by the Department. A registration fee of one hundred dollars ($100.00) will be levied annually.

Section 18. Penalties

~~7.8. Penalties.~~ Any person, firm, corporation or association who violates any of the provisions of Act 402 of 1977, as amended, or any Rules and Regulations promulgated under the authority of Act 402 of 1977, as Amended, shall upon conviction, be deemed guilty of a misdemeanor and shall be punished by a fine of not less than one hundred dollars ($100.00) nor more than one thousand dollars ($1,000.00). Installers, Designated Representatives and Septic Tank

Manufacturers who do not renew their licenses prior to 60 days after the annual expiration date will be charged a late fee equal to one half (1/2) the annual fee.

~~SECTION VIII. ALTERNATE SYSTEMS.~~

8.1. ~~Addition to alternate systems to these Rules and Regulations. Alternate systems, when developed and proven, and when approved by the Department, will be considered in applicable situations. The use of alternate systems will be. Reviewed on a case by case basis. Policies on their use will be provided and periodically updated by the Division of Environmental Health Protection~~.

Section 19. Severability

If any provisions of these Rules and Regulations, or the application thereof to any person is held invalid, such invalidity shall not affect other provisions or applications of these Rules and Regulations which can effect without the invalid provisions of application, and to this end the provisions hereto are declared to be severable.

Section 20. Repeal

All Regulations and parts of Regulations in conflict herewith are hereby repealed.

Section 21. Certification

This will certify that the foregoing Rules and Regulations Pertaining to ~~Individual Sewage Disposal~~ Onsite Wastewater Systems, Designated Representatives and Installers were adopted by the Arkansas Board of Health at a regular executive session of said Board held in Little Rock, Arkansas, on the ___ ~~23~~rd ~~day of July~~ _____, ~~1987~~ 2003.

_____

~~Ben N. Saltzman~~ Fay Boozman, M.D., Director
Arkansas Department of Health

Dated at Little Rock, Arkansas, this ~~23~~ ____ day of ~~July~~ _____, ~~1987~~2003

The foregoing Rules and Regulations, copy having been filed in my office, are hereby approved this ____ ~~23~~rd ~~day of July~~ ____, ~~1987~~ 2003.

_____

~~Bill Clinton~~ Mike Huckabee
Governor

Appendix A

Absorption Area Requirements

Percolation Rate (Minutes required for water to drop 1 inch in prepared test hole)	Loading Rate (Required square footage per gallon of effluent per day)
10 - 15	1.33
16 - 20	1.45
21 - 25	1.60
26 - 30	1.70
31 - 35	1.80
36 - 40	1.90
41 - 45	2.00
46 - 50	2.10
51 - 55	2.20
56 - 60	2.40
61 - 65	2.50
66 - 70	2.60
71 - 75	2.70

Appendix B

Soil Storage Formula

Variables:

dr	Depth to Redoximorphic Features in inches	dr	=
df	Depth to top of product in inches (Depth of Fill)	df	=
dp	Depth to bottom of product in inches	dp	=
w	Width of product in inches	w	=
PP	Product porosity	PP	=
PA	Product cross sectional area in Square feet	PA	=
L	Length of product in feet	L	=
FP	Fill Porosity	FP	=
SP	Soil Porosity	SP	=
CC	Center to Center Trench spacing in feet	CC	=
SL	Slope on Soil Spreading Curve 0.2 for Moderate Hydraulic conductivity soils 0.1 for High Hydraulic conductivity soils	SL	=
MIR	Maximum Long Term Intake Rate in gallons per day per square foot 0.75 for Moderate Hydraulic conductivity soils 1.25 for High Hydraulic conductivity soils	MIR	=

Preliminary Calculations:

R	Adjusted Depth to Redoximorphic Features in feet	R=(dr-8)/12
DF	Depth to top of product in feet	DF=df/12
DP	Depth to bottom of product in feet	DP=dp/12
W	Width of product in feet	W=w/12
TA	Cross sectional area of Trench in square feet	TA=(DP-DF)*W
TP	Trench porosity	

Storage Calculations:

TS Trench Storage in gallons

IF R<DF TS=0 = 0

IF R>DP TS=(DP-DF)*W*L*TP*7.481

Else TS=(R-DF)*W*L*TP*7.481

FS Fill Storage in gallons

IF R<DF FS=R*FP*W*L*7.481

IF R>=DF FS=DF*FP*W*L*7.481

SS Side Storage in gallons

SS=L*R*R/SL*SP*7.481

US Under Trench Storage in gallons

IF R<=DPUS=0 = 0

IF R>DP US=(R-DP)*W*L*SP*7.481

PS End Prism Storage in gallons

PS=R*R/SL*SP*W*7.481

CS End Cone Storage in gallons

$CS=(3.1416*(R/SL)^2*R)/3*SP*7.481$

Storage Loss Calculations

OPT Optimum Trench Spacing

OPT=2*R/SL+W

SSL Side Storage Losses

IF CC>=OPT SSL=0 = 0

IF CC<OPT

ID Interaction Distance

ID= (CC-W)/2

SSL=(R/SL-ID)*(R-(ID*SL)*L*SP*7.481

Total Storage

TTS=TS+FS+SS+US+PS+CS-SSL

Loading Rate:

DUR Duration of saturation = 6 for Brief, 18 for Moderate and 36 for Long

LR=TTS/(DUR*W*L)

Design Loading Rate MIR =_____

If LR<=MIR

DLR=LR

If LR>MIR

DLR=MIR

Trench Length (for 100 gallons daily load)

TL=100/(W*DLR)

Loading Rate Tables developed from the above formula will be provided by the Department for systems as well as gravel substitutes and periodically revised based on available technology.

An example chart is provided below:

Loading Rates for Onsite Wastewater System Absorption areas Based on Seasonal Water Tables

GRAVEL and 4" PIPE

8 – Foot Centers and Optimal Spacing

Gal/ft^2/day

Depth to RMF	8 Foot Centers		
	Seasonal Water Tables		
	Brief	Moderate	Long
inches	Gal/ft^2/day		
8	0.00	0.00	0.00
9	0.03	0.01	0.00
10	0.06	0.02	0.01
11	0.10	0.03	0.02
12	0.15	0.06	0.03
13	0.22	0.07	0.04
14	0.29	0.10	0.05
15	0.39	0.13	0.07
16	0.50	0.17	0.08
17	0.62	0.21	0.10
18	0.73	0.24	0.12
19	0.75	0.28	0.14
20	0.75	0.32	0.16
21	0.75	0.36	0.18
22	0.75	0.40	0.20
23	0.75	0.44	0.22
24	0.75	0.48	0.24
25	0.75	0.52	0.26
26	0.75	0.57	0.28
27	0.75	0.60	0.30
28	0.75	0.64	0.32
29	0.75	0.67	0.34
30	0.75	0.71	0.36
31	0.75	0.75	0.37
32	0.75	0.75	0.39
33	0.75	0.75	0.41
34	0.75	0.75	0.44
35	0.75	0.75	0.46
36	0.75	0.75	0.48
37	0.75	0.75	0.50
38	0.75	0.75	0.52
39	0.75	0.75	0.55
40	0.75	0.75	0.57
41	0.75	0.75	0.60
42	0.75	0.75	0.62
43	0.75	0.75	0.65
44	0.75	0.75	0.67
45	0.75	0.75	0.70
46	0.75	0.75	0.73
47	0.75	0.75	0.75
48	0.75	0.75	0.75
49	0.75	0.75	0.75
50	0.75	0.75	0.75

Depth to RMF	Optimum Spacing			
	Seasonal Water Tables			Optimum Spacing
	Brief	Moderate	Long	
inches	Gal/ft^2/day			
8				
9				
10				
11				
12				
13				
14				
15				
16	0.51	0.17	0.08	8.7
17	0.63	0.21	0.11	9.5
18	0.75	0.25	0.13	10.3
19	0.75	0.30	0.15	11.2
20	0.75	0.35	0.18	12.0
21	0.75	0.41	0.20	12.8
22	0.75	0.47	0.23	13.7
23	0.75	0.53	0.26	14.5
24	0.75	0.59	0.30	15.3
25	0.75	0.66	0.33	16.2
26	0.75	0.73	0.37	17.0
27	0.75	0.75	0.40	17.8
28	0.75	0.75	0.44	18.7
29	0.75	0.75	0.47	19.5
30	0.75	0.75	0.51	20.3
31	0.75	0.75	0.56	21.2
32	0.75	0.75	0.60	22.0
33	0.75	0.75	0.64	22.8
34	0.75	0.75	0.69	23.7
35	0.75	0.75	0.74	24.5
36	0.75	0.75	0.75	25.3
37	0.75	0.75	0.75	26.2
38	0.75	0.75	0.75	27.0
39	0.75	0.75	0.75	27.8
40	0.75	0.75	0.75	28.7
41	0.75	0.75	0.75	29.5
42	0.75	0.75	0.75	30.3
43	0.75	0.75	0.75	31.2
44	0.75	0.75	0.75	32.0
45	0.75	0.75	0.75	32.8
46	0.75	0.75	0.75	33.7
47	0.75	0.75	0.75	34.5
48	0.75	0.75	0.75	35.3
49	0.75	0.75	0.75	36.2
50	0.75	0.75	0.75	37.0

Design conditions

Hydraulic Conductivity	Moderate	***Trench Depth***	18 inches
Trench spacing	8 feet	Trench Width	24 inches
Slope on effluent	20 %	Fill Depth	6 inches
Soil porosity	20 %	Ma. Loading Rate	0.75 gal/ft^2
Trench length	100 feet		

Appendix C

QUANTITIES OF WASTEWATER FLOW FOR VARIOUS TYPES OF ESTABLISHMENTS

ESTABLISHMENT TYPE	GALLONS PER DAY
Airports, bus terminals, train stations	
Per passenger	5
Add per employee per 8 hour shift	20
Barber & beauty shops per chair	100
Bowling alleys	
Toilet wastes per lane	100
For food service, add restaurant usage below	
Camps	
Campground with central comfort stations per camper	35
Day camps (no meals served) per camper	15
Per non resident camper	50
Per resident camper or employee	75
Churches	
Per seat/no food service	5
For food service, add restaurant usage below	
For daycares, add school usage below	
Commercial establishments excluding deli, bakery, or meat department	
Per 100 square feet of floor space	10
Add per 100 square feet of deli floor space	50
Add per 100 square feet of bakery floor space	50
Add per 100 square feet of meat market floor space	100
Country clubs	
Per resident member	100
Per non-resident member ~~present~~	25
Dentists offices	
Per wet service chair	200
Add per non wet service chair	50
Doctors office	
Per practitioner	250
Add per employee per 8 hour shift	20
Factories, exclusive of industrial waste	
Gallons per employee per 8 hour shift	
No showers provided	20
Showers provided	35
Hospitals	
Per bed space	200
For food service excluding patients, add restaurant usage below	
Hotels & Motels	
Regular per room	150
Resort hotels & cottages	75
Add for establishments with self service laundry facility per machine	750
Institutions per meal served per day	65

Mobile home parks	
per single wide mobile home space	300
per double wide mobile home space	450
Nursing homes, rest homes, adult congregate living facilities	
Per bed	100
Add for food service (see Institutions, this chart)	
Office buildings per employee per 8 hour shift	15
Parks, public picnic	
Toilets only per person	5
With bath house, showers, & toilets per person	10
Recreation vehicle park	
Recreational vehicle space for overnight stay, without water & sewer hookup per vehicle space	75
Recreational vehicle space for overnight stay, with water & sewer hookup per vehicle space	150
Restaurants	
Per day per seat per meal setting	30
Using single service articles only per seat	25
Bar and cocktail lounge per seat	30
Carry out only	
Per meal served without public restrooms	5
Per meal served with public restrooms	10
Add per employee per 8 hour shift	15
Residences	
Single or multiple family per dwelling unit	
1 bedroom	150
2 bedroom	270
3 bedroom	370
4 bedroom	450
For each additional bedroom add	50
Rooming houses per occupant space	75
Schools per student	
Day schools & day cares	15
Add for showers	10
Add for food service	5
Add for day school workers	20
Boarding schools	75
Service stations & convenience stores	
Per vehicle served	10
Food service, per meal served	5
Stadiums, race tracks, ball parks per seat	5
Swimming pools and bathhouses per patron	10
Theaters	
Indoor, movies/auditorium per seat	5
Outdoor, drive-ins per space	10
Veterinary clinic	
Per practitioner	250
Add per employee per 8 hour shift	20
Add per kennel, stall, or cage	20

FOOTNOTES:

The estimated flows for residential systems assume a maximum occupancy of 2 persons per bedroom. Where residential care facilities (non-institutional) will house more than 2 persons in any bedroom, estimated flows are to be increased by 75 gallons per each additional occupant.

Waste from food service operations is commercial in nature and may require special system sizing and treatment/disposal considerations. For food service operations, kitchen wastewater flows are normally to be calculated at 66% of the total wastewater flow. Estimated daily flow is based on 3 meals served per seat per meal setting.

Systems serving high volume establishments, such as fast food restaurants, convenience stores, and service stations require special sizing consideration due to above average wastewater volume expected from restroom facilities.

Appendix D

MINIMUM CAPACITY OF SEPTIC TANKS

LIOUID CAPACITY OF TANK (GALLONS)

NUMBER OF BEDROOMS	RESIDENTIAL	COMMERCIAL
1, 2, and 3	1000	Capacity equal to 48 hour flow
4	1250	Minimum 1000

Note: For each additional bedroom add 250 gallons.

Appendix E

Lost Storage Formula

Variables:

Loading Rate (LR)	Most restrictive loading rate for primary site
Trench Loading Rate (TLR)	Loading Rate based on (depth to SWT - depth of backfill)
Width (W)	Width of absorption trench product
Desired Line Length (DLL)	Desired individual line length
Surface Loading Lines (SLL)	Number of lines that are capable of surface loading.
Length 1 (L1)	Total length of line/s that are capable of surface loading
Gallons Per Day (GPD)	Estimated gallons per day usage

Calculations:

Square feet of lines that are capable of surface loading:
W * L1 = Sqft1

Gallons of storage in surface loading lines:
Sqft1 * LR = G1

Remaining gallons to be stored:
GPD – G1 = G2

Square feet required to store remaining gallons:
G2/ TLR = Sqft2

Linear feet required to store remaining gallons:
Sqft2/W =LF

Number of lines needed to store remaining gallons:
LF/DLL = TLL (round up)

Total number of Lines:
TLL + SLL = Total number of lines at desired line length (DLL)

Notes: Only the last line of the manifold and lines on the same (1 inch or less) elevation of the last line will be considered to surface load. Changes to desired line length will require complete recalculation.

Appendix F

Requirements for the Approval of Aerobic Treatment units for Distribution in Arkansas.

Aerobic Treatment units may be used for treating domestic wastewater waste, provided that each unit is installed, operated and maintained in conformance with the following provisions:

1. Aerobic treatment systems designed to treat up to 2,000 gallons of wastewater waste per day shall be tested and listed by an American National Standards Institute (ANSI) certified third party previously approved by the Department. Aerobic treatment units shall be in compliance with the standards for Class I systems as defined by the current ANSI/NSF Standard Number 40.
2. The following additional requirements shall also apply to the construction, design, and operation of aerobic treatment units treating 2,000 gallons per day or less:

    a. A visual and audio warning device shall be installed in a conspicuous location so that activation of the warning device will alert property occupants of aerobic unit malfunction or failure.
    b. Each unit shall be designed or equipped so that regardless of unusual patterns or frequencies of wastewater flow into the system effluent discharged will be in compliance with Class I effluent quality standards as defined by the General NPDES Permit ARG550000, Discharges From Individual Home Treatment Facilities.
    c. The minimum required treatment capacities for systems serving any structure, building or group of buildings; shall be based on estimated daily wastewater flows as determined by the Rules and Regulations Pertaining to Onsite Wastewater Systems, Designated Representatives, and installers.

Appendix G

Requirements for becoming an Aerobic Treatment Unit Distributor

The following items are required to become a distributor of aerobic treatment units used for domestic wastewater treatment. Application is made to the Department:

1. A current septic tank installer's license, septic tank manufacturer's license, or a designated representatives license.

2. Factory trained installation and service personnel capable of providing service within 48 hours. Service personnel must also be currently licensed by the Department as a Certified Maintenance Person.

3. A statement from the National Office stating that in the event of the local franchise going out of business, the service contracts in Arkansas will be honored and renewed by another franchise in an adjoining state or region of Arkansas.

4. Provide orientation seminars to Certified Maintenance Personnel and provide parts and seminars to installers certified to repair aerobic treatment units.

Appendix H

Requirements for Submission of an Onsite Wastewater System Permit Application

1. All items will be submitted in triplicate to the local health unit with the permit fee

2. Completed Onsite Wastewater System Permit Application Form.

3. Vicinity Map.

4. The drawing to be to scale using either 1 inch = 20 feet or 1 inch = 30 feet. The drawing must indicate the house, all onsite wastewater system components, and all other features affecting the location of primary and secondary absorption areas.

5. The direction of North is to be indicated.

6. Property lines must be defined and their dimensions shown. Dimensions that cannot be indicated by scale, must be designated by a shown distance between 2 indicated points. The distance to 2 opposing property lines must be shown to tie the system to one location on the lot.

7. All onsite wastewater system setbacks and their distances must be shown. Structures and their dimensions and all features which affect the locations of system setbacks including the location of utility/service lines must be shown.

8. The driveway and parking area dimensions must be shown.

9. The location and elevation of the water well must be shown along with their distance from all parts of the onsite wastewater system and secondary absorption area. For public water systems, show the distances from the onsite wastewater system's components and secondary absorption area location to the water mains and the water service lines.

10. The location, elevation and distances of all wells and/or onsite wastewater systems on adjoining properties that are within 100 feet of the proposed septic system and secondary absorption area must be shown.

11. Locate and properly size the primary and secondary absorption area and include contour lines or arrows indicating the direction and degree of the lot's slope must be shown.

12. A bench-mark must be designated and elevation shots or rod readings must be shown for all parts of the wastewater system. Ground elevation and flow-line elevations must be provided for all system components. This includes the stub-out and the beginning, middle and end of each absorption trench. Each absorption trench shall be designed on contour, not to exceed 2 inches difference in elevation from beginning to end.

13. The septic tank size and location must be indicated.

14. Unusual soils or topographies that affect the site must be shown and identified. Examples include: excavations, ponds, streams, rock outcrops, drainages, government take lines, etc.

15. The location of percolation test holes on the property must be shown. All percolation test holes used in determining the absorption area size must be within the primary absorption area location.

16. The location of all soil pits on the property must be shown.

17. The flow line elevation of the building sewer stub-out must be indicated on the plans. The flow line elevations of septic tank inlet and outlet must be provided. The flow line elevation of the distribution box/device must be provided.

    .

18. The location of the clean out(s) must be shown.

19. Pipe specifications for all parts of the system must be provided.

20. The absorption trench depth must be indicated.

21. The absorption trench media/product must be indicated.

22. Soil information including hydraulic conductivity, redoximorphic features and depth to bedrock found in the primary and secondary absorption areas from the soil pit must be provided.

23. Pumped effluent systems
    a. All pertinent data required for conventional system must be provided.
    b. Indicate the calculated dose volume.
    c. Provide the construction details and inside dimensions on the dose tank.
    d. Indicate the length and diameter of the pumped effluent line.
    e. Indicate the length and diameter of the pipe from dose chamber to the distribution system.
    f. Indicate the elevation difference between the inlet to the distribution system and pump's shut-off elevation.
    g. Provide the brand, model number and pump curve of effluent pump specified. Include the calculations used to determine the dose volume per minute and friction head. Provide details of the pump control assembly.

24. Indicate the diversion device to be used and it's location.

25. Systems included in the Onsite Maintenance Program must be submitted with a valid contact with a Certified Maintenance Provider.